THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
February 13, 1989 · Vol. XXIII · No. 6 · 142 Pages · $2/Copy · $44/Year

COMPUTERWORLD

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ESA migration lures added

BY STANLEY GIBSON
and ROSEMARY HAMILTON
CW STAFF

IBM sought to entice more customers to its MVS/ESA operating system last week with software intended to show off the power of ESA and hardware that lowers the cost of entry into the strategic environment.

Some users said the announcement provides little incentive to jump on the Enterprise Systems Architecture bandwagon. However, those who have already implemented ESA said the new software is welcome and should provide a performance boost.

Further nudging users toward its flagship operating system, IBM also announced it would stop selling non-ESA 3090 base models and several non-ESA 4381 models as of May. Another ESA incentive took the form of price cuts: Prices on several 3090 memory options, as well as the 4381 E processors, were cut by 9% to 17% (see chart page 129).

"We'll go to ESA someday, but right now we're comfortable with the environment we're in," said George Taback, director of corporate information systems at Ingersoll-Rand Co. in Woodcliff Lake, N.J., a 4381 site.

Although IBM sought to position the enhancements to one product — Data Facility Sort Release 11 — as attaining better performance by exploiting ESA features, it also said the software will bring increased speed to MVS/XA users

Continued on page 129

Coming on strong
The relatively new 3090 S models are rapidly catching up with older 3090s

Model (Ship date)	Installed base as of Q4 '88	
	U.S.	*Offshore*
Base models (Aug. 1985)	1,370	400
E models (May 1987)	1,030	1,480
S models (Sept. 1988)	575	840

SOURCE: INTERNATIONAL DATA CORP.

IBM axes costly flop

BY AMY CORTESE
CW STAFF

A massive project to develop DB2-based accounting software has quietly been dropped by IBM, but not before the firm sunk tens of millions of dollars into the effort, project insiders said. The failed endeavor, which was never officially announced, was begun in 1986 by IBM and Arthur Andersen Consulting and was to produce the first Systems Application Architecture applications, several sources said.

The software was to be a product offering from IBM, but two large users were also involved at various times. Custom development was performed for United Airlines under the aegis of another IBM project, which the airline pulled out of in 1987. General Electric Corp. became involved with the software project, code-named Whitewater, in early 1986, sources said.

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EWSPAPER

RECRUITING IN MIS

Facing up to hire stakes

BY GLENN RIFKIN
CW STAFF

In an era when Fortune 500 companies often have 100 or more MIS openings at any given time, the question remains, "How do I find these people?"

The need for new-wave information systems types remains acute. Companies know they must have the right people to staff MIS, but it is a lot easier to say you want state-of-the-art professionals than it is to find them. MIS organizations are solving the recruitment dilemma with innovation — but there are no surefire solutions.

- In Texas, tens of thousands of high-tech professionals fled when the oil glut of the early 1980s turned the local economy into quicksand. Desperate to find experienced information systems recruits, a group of large corporations, once rivals for talent, banded together to form a consortium. Now 160 strong, the companies share the recruitment burden, sending resumes to each

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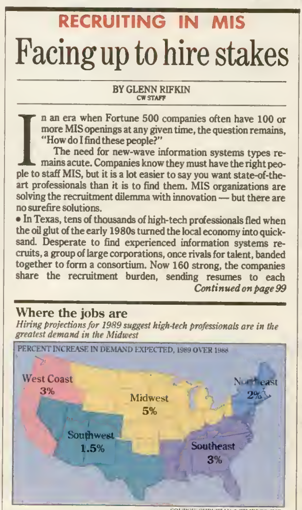
Where the jobs are
Hiring projections for 1989 suggest high-tech professionals are in the greatest demand in the Midwest



SOURCE: CHRISTIAN & TIMBERS, INC
CW CHART: DOREEN DAHLE

Primerica data staff crunched

Merger impact takes toll on subsidiaries

BY ROBERT MORAN
CW STAFF

A little less than two months after its acquisition by Commercial Credit Co., Primerica Corp. is embarking on a major consolidation of its data processing operations that will collapse its 13 data centers into three regional sites.

According to Edwin Sherrin, senior vice-president and chief information officer at Primerica, the company is seeking economies of scale and cost reductions through consolidation. The streamlining comes in the wake of the $1.7 billion acquisition announced in August 1988 and finalized in December.

Sherrin, who held the same title at Commercial Credit before the merger, said he is not certain about the number of reductions that will follow the consolidation. However, Thomas Gaughan, Primerica vice-president of information systems and services for the past five years, said that "most key people in corporate information services at Primerica are presently in transit." Gaughan himself "is pursuing a number of opportunities," he said.

How many cut?

Gaughan said he had no perspective on the amount of MIS reductions throughout Primerica subsidiaries, but a personnel employee at National Benefit Life Insurance Co. who asked not to be identified said that MIS staff there had been cut by approximately 50% in the beginning of December.

Sherrin said, however, that just after the merger, some of the MIS operations at the subsidiaries were reduced without respect to consolidation. Other centers, he said, were running economically: "We said, 'Look guys, it's time to start making money, and we have to get lean and mean out there.' "

The current consolidation task, according to Sherrin, will involve folding the 13 data cen-

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Paving the way. AT&T lays down migration path for merging System 75 and 85 PBXs into single, higher capacity switch, providing ISDN links to user devices. Page 6.

Neck-and-neck. EISA, MCA and AT bus 16M bit/sec. Token-Ring adapters and sister cards are expected to arrive in tandem this spring. Page 10.

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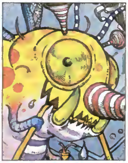

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W. FORD CALHOUN
SMITH KLINE & FRENCH

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Are feds partial to IBM?

House investigates alleged agency favoritism

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A powerful congressional committee began an investigation last week into allegations that the U.S. Navy and possibly other federal agencies are steering big hardware contracts to IBM, contrary to government requirements for full and open competition.

The investigation by the U.S. House Committee on Government Operations was triggered in part by complaints from IBM-compatible vendors such as Amdahl Corp., Storage Technology Corp. and Vion Corp., which resells hardware from National Advanced Systems.

In the announcement, committee Chairman John Conyers Jr. (D-Mich.) said the vendors charged that procurement officials have improperly favored IBM in their contract awards for what are called IBM code-compatible systems.

Conyers ordered a full-scale investigation by Congress' General Accounting Office (GAO).

IBM spokesman Mark Holcomb said IBM welcomes the GAO investigation and believes the study will show that the federal procurement process is competitive. He said the committee is "responding the way we would want them to respond if we had raised questions about our competitors."

The inquiry will focus not only on alleged bias toward IBM in IBM-compatible procurements but also on the propriety of having IBM-compatible specifications at all. "These procurements are restrictive to begin with, since only companies offering compatible systems are allowed to compete," the committee announcement said.

An interim report on the GAO probe is due the first week of April.

Conyers specifically requested investigations of procurements at the Departments of the Navy, Army, Health and Human Services, Housing and Urban Development as well as the National Aeronautics and Space Administration.

Conyers pointed out that statistics from Computer Intelligence, a market research firm in La Jolla, Calif., show that IBM has a 55% market share of large systems in the Navy, compared with a 37% share governmentwide.

Court sides with Intel on chip microcode copyright question

A U.S. District Court decision on Intel Corp.'s suit against NEC Electronics, Inc. last week set a precedent by agreeing with Intel's claims that chip microcode can be copyrighted but left open the potential for others to reverse-engineer popular chips.

"It leaves a legal way to clone 80386s, but it won't be easy," said Mike Feibus, an analyst at In-stat, Inc. "But Intel has the copyright, [so clone makers] can expect a lawsuit."

The 5-year-old lawsuit was over microcode copyrights on Intel's 8086 and 8088 chips. The court found the copyrights invalid or not infringed upon by NEC because Intel's licensees had not included copyright notices on a substantial number of chips, and Intel did not make a "reasonable effort" to correct the labeling situation.

NEC had reverse-engineered V20 and V30 processors to be compatible with Intel's 8086 and 8088 processors. The NEC chips included microsequences that resembled but were not identical to Intel's chips. Judge William Gray said that while Intel's microcode is copyrightable, NEC's similar microcode was "only a small segment of the copyrighted microcode."

Intel is reportedly considering an appeal of the reverse-engineering aspect of the case.

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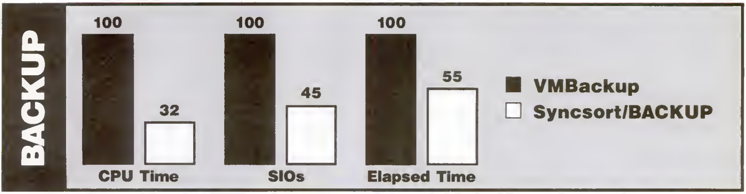

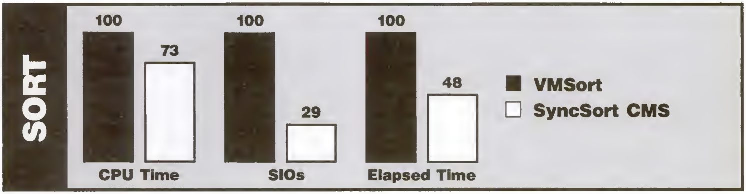

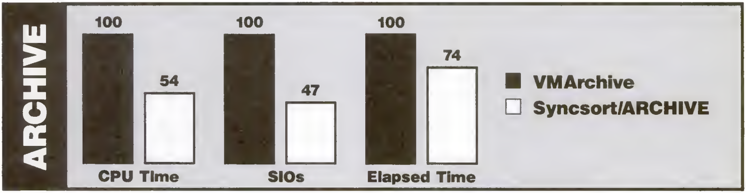

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WHERE PERFORMANCE IS THE ISSUE.

Newsman faces tamper charge

BY MICHAEL ALEXANDER
CW STAFF

TAMPA, Fla. — A Florida television newsman at an ABC affiliate was arrested last week in what law enforcement officials are calling the first case of media espionage in U.S. history.

Michael Shapiro, an assistant news director at WTSP-TV (Channel 10) in Tampa, was arrested Feb. 7 on felony charges of allegedly breaking into a competitor's computer system and stealing sensitive information related to the station's news-gathering operations. Attempts to contact Shapiro were unsuccessful; a Channel 10 official declined to comment.

Shapiro is believed to have penetrated a computer system at rival CBS affiliate WTVT-TV (Channel 13) on at least six occasions between Jan. 4 and 26, according to Patricia Rodgers, a Florida Department of Law Enforcement special agent.

The accused news director was formerly employed by WTVT as an assignment manager and was responsible for administering its Digital Equipment Corp. Microvax 2000 computer system and Basys, Inc. software, which is widely used by television and radio stations.

"He was on the ground floor when the computer system was installed and configured last August," Rodgers said.

Although computer users and system administrators at WTVT routinely change computer system access codes and passwords when employees leave, Rodgers said "a few codes slipped through" when Shapiro left. "The first computer breach was discovered on Jan. 12 when the morning producer came to work and discovered a number of confidential and sensitive files missing," said Bob Franklin, interim news director at WTVT.

The missing files contained information about news stories in progress or being planned, rundowns of how stories were to be handled during midday and evening news broadcasts and planned format changes and special projects. "The information is highly sensitive and competitive," Franklin said. According to ratings by A. C. Nielsen Co. and Arbitron, Channel 13 is the top station in Tampa and Channel 10 is last, he said.

Digging

The station contacted officials at the Florida Department of Law Enforcement, who began investigating and tracing calls to the station's computers.

"Toll phone records showed that Michael Shapiro was making calls from his residence and from a personal computer in his office at Channel 10," Rodgers said. Several of the calls preceded the noon and 6 p.m. news broadcasts, she added.

"We also found that he had reviewed other reporters' files, plans of how the station intended to handle such stories as the [convicted serial killer Theodore] Bundy execution, Martin Luther King's birthday holiday and the presidential inauguration," Rodgers said.

Once armed with sufficient evidence, Rodgers and Special Agent Richard Pyles obtained a warrant to search Shapiro's home on Jan. 7. "We found the rest of the evidence we were looking for," she said. "We seized a personal computer, 200 floppy disks, a Basys operating manual and user guide."

Shapiro has been charged with 14 felony counts under Florida State Statute 815, which covers computer-related crimes. Each count carries a maximum sentence of 15 years and a $10,000 fine.

"We're calling it media espionage," Rodgers said. The arrest of a person suspected of illegally penetrating a computer system at a media company is the first of its kind, she added.

There have been several attempts to penetrate computer systems at Atlanta-based Cable News Network, said Fred Tasse in the technical support management information services department at Turner Broadcasting System, Inc.

"We caught someone dialing in as a news intern through a generic log-on just the other day," he said. "It's always scary that someone could get into the system, but I'm not losing sleep about it."

Primerica

FROM PAGE 1

ters into "a service bureau environment," take approximately two years to complete and save the company millions of dollars in annual operating expenses.

Commercial Credit, which renamed itself Primerica after the acquisition, had its mainstays in business credit, state banks, loans and insurance. Primerica's businesses include a variety of insurance underwriting, mutual funds, asset management, mortgage and investment banking, as well as direct-mail marketing.

According to Tom Nickles, a principal at Index Group, Inc., a consultancy based in Cambridge, Mass., data center consolidations have become a trend in acquisitions because they yield great economies of scale from reductions in software, hardware and personnel costs.

Other companies facing consolidations have worried that service levels might drop, but Nickles said they have found the reverse to be true. "Consolidated centers tend to provide a fuller portfolio of software and longer hours of service than separate data centers," he said.

Sherrin, while noting that the company's plans are not yet firm, said Primerica has been gathering data from its business units since the Dec. 15 acquisition and that the numbers show that the consolidations will garner the company huge savings. "You don't want to pay all those licenses, all those maintenance fees, all that overhead 13 times over," he said.

Aside from Gaughan, most MIS executives at various Primerica subsidiaries refused to comment. However, William Miller, senior vice-president of information services at Voyager Life Insurance Co., a Primerica subsidiary, said that he did not expect to lose MIS staff.

Primerica's Gaughan

When completed, Primerica DP operations will consist of three regional data centers — in the Northeast, Southeast and Southwest — each performing major processing functions for its diverse companies. However, the Smith Barney, Harris Upham & Co. unit "will probably always be a stand-alone data processing shop," Sherrin said.

Sherrin confirmed that applications development staffs will remain at the subsidiaries because "applications people need to be with the rest of the business people — the users — to understand their needs and make sure they are satisfied."

Sherrin said the company is still deciding which MIS employees will be moving to the geographic centers. "We plan to keep the key people, the talented people, and look at relocation where it might be necessary," he said. "But we don't want our MIS people to think there will be a big hit against them — because that is not true."

Primerica's Sherrin

The consolidation will be overseen by Sherrin. "Corporate already runs a couple of the data centers," Sherrin said. "But we may eventually turn over the consolidated data centers to a separate business unit."

According to Gaughan, such consolidations were considered at Primerica about six years ago but did not accord with management's philosophy of decentralization. "If you look practically at what can be achieved, you can improve economies of scale," Gaughan said. "It makes some sense, but you compromise the organizational philosophy."

CORRECTION

"Stripping down IS" [CW, Dec. 26/Jan. 2] contained several errors as a result of ststements made to *Computerworld* reporters that were not properly verified.

The article, which profiled an MIS director at Playboy Enterprises, Inc. in Boulder, Colo., neglected to mention the role of a second director of MIS, John A. Ullrick, who is in Playboy's Chicago office. Playboy's central processing is set to shift from Boulder to IBM System/38 and Application System/400 computers in Chicago beginning in March. Playboy's MIS budget is not being reduced but will increase in the next fiscal year, Ullrick said.

Only one Playboy application is scheduled to be moved to a service bureau, not several applications as the story stated. However, several applications have been moved to service bureaus in recent years.

Playboy's IBM System/38 is not used primarily for batch work, as the article stated. Ullrick said Playboy has more than 60 on-line users and runs batch work mostly at night. The story also incorrectly stated that there will be minimal applications development in-house. Playboy plans to develop financial systems, office automation and document and image processing internally.

Finally, Los Angeles is not a pilot site for Playboy's System/38 applications. Users will be brought on-line simultaneously there and in Chicago.

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	La Jolla	Feb 9am
	Los Angeles	Jan 19fm Feb 16acr
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	Oxnard	Feb 2fm
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	San Diego	Jan 17fr
	San Francisco	Jan 24fr Feb 15apr
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	Lansing	Feb 14fp
	Troy	Jan 10c
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NC	Charlotte	Jan 25
	Greensboro	Feb 15r
	Raleigh	Jan 10fr
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	Princeton	Jan 18f Feb 15t
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AT&T PBXs get link to ISDN

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — With a sideswipe at IBM for "deadending" the older Rolm Systems CBX line, AT&T announced last week the long-awaited migration path for converging its System 75 and System 85 private branch exchanges (PBX) into a single higher capacity switch, becoming the first major vendor to provide Integrated Services Digital Network (ISDN) links between its PBX systems and user devices.

AT&T's Definity 75/85 Communications System introduces communications processors and "universal port modules," which the vendor said can be used to upgrade either the midrange System 75 or the higher end System 85 to the Definity Generic 2, which handles more than 30,000 lines. The migration of a System 75 or 85 to Definity preserves 80% to 90% of users' original investment in software, line cards and peripherals, according to AT&T.

"The key thing we wanted to do was to allow users growth in size and functionality without the classic forklift," said Jack Bucter, AT&T's vice-president of product management and marketing.

AT&T announced that both Definity models will support the 1.5M bit/sec. ISDN Primary Rate Interface, which is typically used to handle traffic between switches and large hosts. Definity Generic 2 models will also support the lower speed Basic Rate Interface, which handles links between switches and user devices such as telephone sets and workstations.

Basic Rate support is a breakthrough for AT&T, because it potentially allows other suppliers to attach their voice and data equipment to the firm's PBXs, said Thomas Nolle, president of Haddonfield, N.J.-based consulting firm CIMI Corp. The major switch vendors have been holding on to their proprietary PBX interfaces because major profits currently come from selling such peripheral devices, he added.

One major flaw in AT&T's migration strategy is the fact that it provides no entry point for small corporate sites, because its low-end System 25 is not included in Definity, Nolle said. System 75 only becomes cost-effective at roughly 150 lines, and 80% or more of new PBX sites start their installations at less than 100 lines. Other vendors, such as Siemens AG, have a PBX migration path from very low end to high end, he said.

System 75 users who do not need the full power of Generic 2 can upgrade to Definity Generic 1, which is said to handle up to 1,600 lines. Definity 2 reportedly combines the System 85's processor, switch and software with the universal ports and hardware upgrades that provide its greater line capacity, AT&T said. Multiple Generic 2s can be linked together for a 100,000-line capacity.

Definity helper

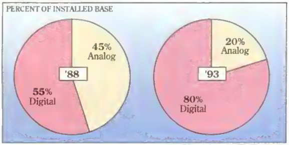
Also introduced by AT&T last week was the Definity Manager series of software products for configuration, traffic and performance monitoring and analysis and troubleshooting of the Definity line. The Manager I and II run on AT&T MS-DOS-compatible workstations; Managers III and IV run on AT&T 3B computers and use the Informix Software, Inc. database management system to collect and report on network statistics.

AT&T also announced Service Node Controller, a future product that will reportedly allow Definity Generic 2 users to configure Electronic Tandem Network (ETN) links between PBXs via an ISDN Primary Rate Interface link to an AT&T central office switch. This eliminates the need to do ETN routing via costly and time-consuming connections to a series of ETN switches, Bucter said.

System 75 customers reportedly can upgrade their systems to a Definity Generic 1 for $8,500, while System 85s can be upgraded to Definity Generic 2 for $35,000, including system management. Generic 1 is scheduled to ship in March, Generic 2 in July.

The digital switch

Digital private branch exchange systems are rapidly edging analog systems out of the market



SOURCE: THE EASTERN MANAGEMENT GROUP
CW CHART: FRANK C. O'CONNELL

One-upping IBM

ISDN support was a deciding factor in the selection of AT&T's just-announced Definity system over Rolm Systems' 9750 PBX at Loyola University, according to Joseph Catrambone, the Chicago university's vice-president for information systems.

Loyola also liked the fact that it can install a System 85 in its dormitories in July and then migrate it to Definity Generic 2 for approximately $5,000, according to Arthur Krumrey, assistant vice-president of IS. The System 85 is initially needed because the Generic 2 will not be available until fall, he added. Loyola plans to have three Definity systems serving a total of 7,000 telephones as well as occasional data users, Catrambone said.

The university's final choice was between IBM and AT&T, Catrambone said, because both offered Loyola a leasing arrangement under which voice and data costs would be approximately the same as using the current one over the next few years. But while AT&T is offering ISDN for both the System 85 and Definity, IBM has yet to announce a release date for ISDN on the 9750. Loyola plans to use ISDN for its voice, data, facsimile and eventually image transmissions, Krumrey said.

ELISABETH HORWITT

Damages lawsuit stalls sale of Leading Edge

NEWTON, Mass. — The founder of Leading Edge Products, Inc. was stalled last week in his efforts to sell his company after the plaintiff in a pending lawsuit against the personal computer clone maker obtained a temporary restraining order barring the sale.

James B. Royal, a former Leading Edge employee who developed the Leading Edge Word Processor software package, had previously sued the company for damages of $1 million in additional royalties. Last week, Royal was granted a restraining order against the sale of Leading Edge to Riviera Beach, Fla.-based PC Systems, which has reportedly agreed to pay $921,000 for the Leading Edge name and logo [CW, Feb. 6].

The firm said it had offered rights to the software package, which far exceed the maximum $1 million recovery Royal seeks, as security in the case.

However, after the judge said security from the word processing package would not be sufficient, Leading Edge founder and majority shareholder Michael B. Shane agreed to an attachment on company property valued at more than $1 million and his own Newton, Mass., condominium, which is valued at approximately $775,000, as security.

A Leading Edge spokesman said that as of Thursday afternoon, the judge had agreed to lift the restraining order pending the appraisal of the property.

3Com puts Netview link on OS/2

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Striking a blow for Systems Network Architecture (SNA) gateways everywhere against IBM's own pure LU6.2 strategy, 3Com Corp. unveiled Netview connectivity and SNA-like resource directory features for OS/2 Extended Edition workstations on 3+Open local-area networks.

3+Open Maxess, based on the 3+Open LAN Manager product co-developed by 3Com and Microsoft Corp., turns an OS/2 Extended workstation into a server that links other workstations to IBM hosts, using either IBM 3270 or LU6.2 protocols, 3Com said.

Maxess 2.0, due to ship this fall, will also maintain a directory of network resources so that users and applications can transparently access a file or a peripheral anywhere on the network or in a group of interconnected networks, said John Pickens, 3Com's director of communications architecture. The service is modeled on a directory facility that IBM provides for its LU6.2-based Advanced Peer-to-Peer Networking (APPN) facility, but the computer vendor offers no equivalent feature on OS/2 Extended servers, Pickens said. IBM has indicated that it will migrate APPN functions to other types of systems at an undisclosed date.

3Com's announcements strengthen its strategy of using Netbios software to network IBM's Personal Computers and Personal System/2s and providing comparatively limited host access through an SNA gateway, said Steven Randesi, co-founder of Gen2 Ventures in Saratoga, Calif. By providing directory functions and other features that IBM has not yet introduced for OS/2 Extended, 3Com can woo customers whose communications "are mostly between PCs and servers," he added.

However, corporate LAN users whose workstations will be doing a lot of talking to mainframes and IBM Application System/400s will probably still wait for IBM to fill in its SNA networking approach, which provides full-function peer-to-peer communications between all types of computing devices, including PCs, Randesi said.

Making passes

Maxess 2.0 will also be able to pass network alerts and alarms from 3Com networks to IBM's host-based network management system, Netview, and pass back Netview commands that respond to reported problems, Pickens said. The initial release will support only LANs developed by 3Com acquisition Bridge Communications, Inc., however.

Applications written for IBM's 3270 High-Level Language Application Programming Interface and Server Requester Programming Interface will run on Maxess 3+Open without modification, 3Com said. The product will be compatible with IBM's OS/2 Extended's Communications Manager. Version 2.0 of the gateway, slated for availability next fall, will also provide access to CCITT X.25 networks. Both versions will support IBM's Token-Ring network as well as 3Com's Ethernet LANs.

While an MS-DOS version of Maxess already exists, porting the product to an OS/2 server allows users to run other functions such as printer or file-serving concurrently with the gateway, Pickens said. Version 1.0, scheduled for availability this summer, supports MS-DOS clients; Version 2.0 will support OS/2 clients. Pricing will be announced when the products are available.

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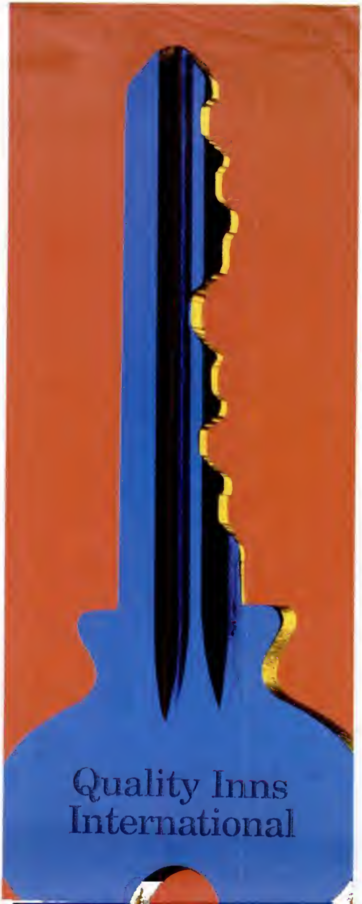

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NEWS SHORTS

New partners for Mips

Mips Computer Systems, Inc. signed two agreements last week for major computer vendors to license its reduced instruction set computing technology. Siemens AG and NEC Corp. said they will move into production phases with Mips-based products later this year.

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A bit slow at the IRS

The Internal Revenue Service said last week that a programming error caused a week's delay in mailing roughly 450,000 refund checks. A spokesman said the IRS immediately found the flaw in the program, which would have sent tax data to the wrong regional service center, and chose to reprocess those returns. Checks for people who filed returns in mid-January will be mailed Feb. 17, a week later than originally planned.

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Coming into view

MCI View, a network management service designed for users of IBM's Netview, will be commercially available in April, MCI Communications Corp. said last week. MCI View, which has been tested by select customers such as Covia Corp. and Texaco, Inc. since mid-1988, will be available to all customers using MCI's Vnet or Terrestrial Digital Service 1.5 network services. Originally slated for 1988 delivery, MCI View was held up while MCI waited for feedback from beta users, MCI said. The price is $2,000 a month, with a $1,500 installation charge.

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Ax falls at Bull

Bull H.N. Information Systems, Inc. gave out termination notices Friday to about 1,600 U.S. employees, Bull spokesman Patrick Marx said. The reduction in the mostly administrative and manufacturing jobs — which includes layoffs and some early retirements — is expected to be completed in March. The pink-slipped employees represent 16% of Bull's U.S. work force and 8% of its worldwide personnel. First announced Jan. 5, the cuts were attributed to streamlining for competitive purposes. "This is not a defensive move to protect ourselves from losses," Marx said.

……

Efficiencies, not layoffs

A Cullinet Software, Inc. executive last week denied rumors of an impending mass layoff at the Westwood, Mass.-based software company but confirmed that "upper middle-level managers" have been told to search vigilantly for opportunities to cut costs by reducing head counts. Contrasting the quest for efficiency with last May's elimination of 400 jobs, Cullinet Vice-President of Corporate Marketing Jeffrey Papows said, "There will be people leaving, but there will be no big bang." Cullinet's wrenching restructuring, Papows said, "is behind us. This is just normal due diligence."

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Dataproducts seeks buyer

Printer maker Dataproducts Corp. went on the auction block last week when it freed investment banker Goldman, Sachs & Co. to contact prospective buyers for what Dataproducts said would be a significant premium above its market price. Dataproducts, with $345 million in annual sales, said it has made no final decision to sell.

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Plexus aims high and low

Plexus Computers, Inc., an old-timer in the young imaging systems arena with products on the market since 1987, released an entry-level system last week designed to support work groups of up to eight users and announced plans for a high-end data server based on the Motorola, Inc. 68030 microprocessor. Scheduled for release later this year, the low-end, based on an Intel Corp. 80386 chip and Unix, brings Plexus' entry point down to approximately $97,000 for a four-user configuration. The high-end imaging system, which will be offered as an SQL-based data server, will reportedly handle between 30 and 50 image transaction/sec.

IS execs to run airline alliance

BY ALAN J. RYAN
CW STAFF

ATLANTA — The ink is dry on an agreement between Delta Air Lines and American Airlines to form a global computer reservations system, but it may take up to 50 days before the U.S. Department of Justice either approves or disapproves the plan.

If approved, the combined reservations system will be the product of an independently managed new firm based in the Dallas/Fort Worth area and managed by information systems professionals from both airlines.

At the helm will be Max Hopper, American's senior vice-president of information services, who will serve as chairman of both the partnership and an advisory committee of the board. Cal Rader, Delta's assistant vice-president of automation, will serve as vice-chairman and chief executive officer.

Filling out the management lineup, Kathy Misunas, president of American's Sabre Travel Information Network, was named president and chief operating officer of the new company; members of the board will include Robert Crandall, chairman, president and CEO of American, and Ronald W. Allen, chairman and CEO of Delta.

American's Hopper

Hopper, who first joined American and AMR Corp., American's parent, in 1972 after stints at Shell Oil Co., Electronic Data Systems Corp. and United Airlines, was responsible for leading American's distribution of its Sabre reservation system to travel agents. Sabre had been used internally since the early 1960s and now incorporates nearly 100,000 terminals and printers. Hopper left American in 1982 and went to Bank of America for three years, but returned to the airline in 1985.

The papers for the independent partnership, which will combine the systems of American and Delta, were signed in Atlanta last week. According to an American spokesman, the agreement papers were filed with the Justice Department and the Federal Trade Commission last Tuesday. A Justice Department spokesman said he was not at liberty to confirm whether or not the papers had been filed.

Equal ownership

According to the plan, Delta and American will each own 50% of the company, but because Delta's reservation system is smaller, that company will pay American $650 million over the next two years.

The partners also said they will offer domestic and international airlines and other entities an opportunity to become equity partners. If and when other partners join, the percentage ownership of Delta and American will be reduced equally and could eventually fall to a minimum of 25% each, according to reports. For airlines that wish to buy into the system, the price tag will be $20 million per one percentage point, American spokesman John Hotard said. If an airline chose to purchase 5% of the new reservation system, it would cost $100 million, he said.

The company will contract with American's data processing and communications division, known as Sabre Computer Services, for computing and communications services.

A Justice Department official said the department has 30 days to investigate the system, but if additional information is requested, that time could be extended to 50 days plus the time it takes the airlines to furnish the requested information.

"What we are obliged to do under the Clayton Act is gather evidence to try to determine if the combination of the two systems is likely to substantially lessen competition in any market — including airline and [reservation system] markets," the Justice Department spokesman said. The department will also look into other relevant markets, whether they are regional or national, he said.

Meanwhile, the airlines involved said the new company will stimulate competition in the U.S. and overseas and will eliminate government criticism of reservation systems owned by single owners. American's Sabre and Delta's Datas II are the only major single-owner computer reservations systems in existence, they said.

AMS chief takes over systems at State

BY MITCH BETTS
CW STAFF

ARLINGTON, Va. — Ivan Selin, a "Pentagon whiz kid" in the 1960s and founder of American Management Systems, Inc. (AMS), will resign from his post as chairman of the computer software and services firm as of March 6 to become undersecretary of management at the U.S. Department of State.

President Bush recently nominated Selin for the No. 3 job under Secretary of State James Baker. If confirmed by the Senate, Selin will oversee all administrative, personnel and financial operations, including the information systems and telecommunications departments.

Selin, 50, declined comment until after his Senate confirmation, but he told *The Washington Post* last year that he was bored with the success of AMS and figured the company could run very well without him.

Selin had previously announced his intention to leave the firm in 1989, so his departure was no surprise, AMS officials said. A new chairman will be designated on Friday.

"Starting with a few people in a sublet office, Ivan guided the firm through 19 consecutive years of growth to our current level of 2,500 employees, one of the largest computer systems consulting firms in the U.S.," said Charles O. Rosotti, president and chief executive officer at AMS, in a statement last week. AMS revenue for 1988 is estimated at $215 million.

AMS' Selin

Selin was a management expert at the U.S. Department of Defense from 1965 to 1970, when he left to start AMS. He was part of a group of "whiz kids" hired by then-Secretary Robert S. McNamara to bring a systems analysis approach to military programs and reached the level of acting assistant secretary of systems analysis.

While at AMS, Selin was involved in several foreign-relations panels, including advisory boards for the Central Intelligence Agency and the National Academy of Sciences.

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Race on to deliver MCA, EISA goods

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Spring deliveries of 16M bit/sec. Token-Ring adapters optimized for the Extended Industry Standard Architecture (EISA) bus are expected to overlap with initial shipments of sister cards designed for machines with the IBM AT and Micro Channel Architecture (MCA) buses.

Compaq Computer Corp. is working closely with Token-Ring vendor Proteon, Inc. and other suppliers of network adapters to assist them in building EISA cards.

According to Proteon Vice-President of Marketing Nate Kalowski, which cards are delivered first is mostly a matter of which chip maker can ship in volume first — Texas Instruments, Inc., with its 16M bit/sec. Token-Ring chip set, or Intel Corp., which is supplying the EISA chip.

Kalowski confirmed that Proteon is developing an EISA bus-mastering card from the ground up that will be able to operate at either 4M or 16M bit/sec. Bus mastering enhances performance by routing data off the network directly into system memory and eliminating read and write operations to the direct-memory access controller. It also offloads this activity from the system CPU.

Proteon demonstrated a 16M bit/sec. MCA card in the fall and plans to support both platforms. It is too early to set pricing for cards for either bus, Kalowski said.

Also thinking adapter

The vendor is considering an EISA adapter for its nonstandard 10M bit/sec. Token-Ring as well, Kalowski said.

"The EISA platform is a good fit for Token-Ring technology because of the performance of its 32-bit bus and I/O, which makes for a good file server for data- and graphics-intensive applications," he said. "We believe that EISA will be a major player."

Confirmation of Compaq's efforts with network adapter card suppliers follows reports from sources close to Compaq and Novell, Inc. that the two are considering a deal allowing Compaq to reference-sell Novell's Netware 386 network operating system with Compaq's 33-MHz server based on Intel Corp.'s 80386 processor. Both products are expected to ship in the second or third quarter.

There is some speculation that Compaq may be positioning itself for a run at the work group server market. Users are increasingly employing 386 computers as file servers on local networks, and Compaq is the No. 1 seller of 386 boxes. Novell has long-standing relationships with both Proteon and Compaq and said last week that it plans to deliver an EISA driver for its software once EISA machines are shipping in volume. Neither Novell nor Proteon sell server hardware.

Micro Channel gains support; boost expected

BY WILLIAM BRANDEL
CW STAFF

Good-news bouquets have continued to shower the Micro Channel Architecture (MCA) in the last two weeks, as a core of support builds for the IBM technology.

- Ing. C. Olivetti & Co., a co-founder of the MCA rival Extended Industry Standard Architecture (EISA), announced two MCA-compatible personal computers last week, with availability scheduled in June. This marks the second EISA member to bring MCA compatibles to market; Tandy Corp. is still filling back orders for its MCA machines.
- IBM has hinted at plans to introduce an improved version of MCA this spring. According to IBM senior engineer Chet Heath, Micro Channel bus speed could be improved significantly by simply removing the wait state. Heath said the wait state was applied to slow the bus down and balance data transfer speed between the bus and the processor.

An IBM spokesman said the enhanced Micro Channel will be compatible with the Micro Channel implementations used on the Personal System/2 Models 60, 70 and 80. The spokesman said IBM would not implement the bus until Intel Corp. announces its faster 33-MHz 386 microprocessor, expected out this spring.

- The Sierra Group, Inc., a Tempe, Ariz.-based market research firm, has dramatically revised its research to support MCA-based PS/2s. Last September, when EISA was announced, the group forecast that users would reduce their plans to purchase MCA machines. However, a new study found that 77% of Fortune 500 users polled will buy PS/2s and that three-quarters of these units will have a Micro Channel bus.
- Businessland, Inc. denied a report that the retail giant had decided not to sell EISA-based systems. But, Chairman David Norman said, "We believe Micro Channel is an industry standard. . . . We'd like to see the rest of the world behind it."

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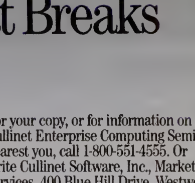

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Apple, DEC say look to third parties until pact bears fruit

BY JULIE PITTA
CW STAFF

NEW YORK — Apple Computer, Inc. and Digital Equipment Corp. said last week their alliance will spawn jointly developed products but cautioned that end users with an immediate need to connect Apple's Macintosh personal computers to DEC's VAX minicomputers should consider third-party offerings.

"We have engineers working, and engineers build products," said Pierre LeClerc, a product marketing manager at Apple. "But don't make any assumptions about packaging or distribution; they may not be the kind of products you buy off a retail shelf. They may be more in the line of services."

Apple and DEC officials said their engineers have been working diligently in the year since their joint development agreement was announced. They declined to elaborate on what form the new products will take. The comments were made at a Dexpo East '89 conference for end users on the Apple-DEC partnership.

Earlier this month, an Apple spokeswoman said the DEC-Apple alliance would not necessarily yield products. She said the focus of the joint development was to establish guidelines for third-party developers.

Corporate customers have criticized Apple and DEC's failure to introduce products after slightly more than a year of work together. End users might be heartened by last week's promise of products co-developed by Apple and DEC. However, no introduction dates were promised.

Instead, the partners are encouraging customers with pressing needs not to wait. "It's not our intention necessarily to come in and replace what already exists. We're providing developers with architectural information on a daily basis," said Blake White, an Apple product marketing manager. "It's not as though you're taking a risk."

Despite the firms' advice, corporate customers are less than pleased with third-party products. "With third parties, there's always the issue of, will it work?" said Jack Mulligan, systems manager at *The Boston Globe*. "When there's been a change in the hardware's operating system, we've had problems with third-party products."

Also, Mulligan said, third parties tend to offer erratic service compared with more established vendors such as Apple and DEC.

Netware gets its first port to Unix

BY PATRICIA KEEFE
CW STAFF

NATICK, Mass. — Prime Computer, Inc. last week uncorked what promises to be the first in a series of OEM relationships between Novell, Inc. and Unix systems vendors that plan to port Novell's Netware network operating system to Unix-based servers.

These alliances will provide Novell with support for Unix clients while also supplying many minicomputer vendors with their first crack at linking local DOS- and OS/2-based networks to minis repositioned as network servers.

Possibly anxious for a bit of positive news while it fights a hostile takeover bid, Prime irked some Novell officials by jumping the gun with the unveiling of its plan to port Netware to its Prime EXL Unix-based supermicrocomputer, an Intel Corp. 80386 Multibus II-based server.

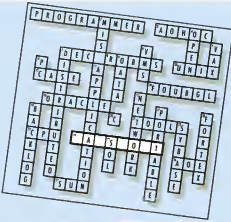
"Prime felt a little more strongly that they needed to make this announcement now — I don't know if this is related to the takeover attempt — and when they pressed the issue, we said OK," Novell spokesman Mike Judson explained.

Novell has moved announcements slated for Feb. 21 to the Networld 89 Boston show scheduled the following week and confirmed that it will make several other Unix-related announcements there.

A source close to Novell said the vendor will deliver a Unix product and pointed out that Unix is available in multiple flavors and on many hardware platforms.

Under the agreement, the two companies will produce two servers: native-mode Netware running on Prime EXL, which is slated to ship in the second half of 1989, and Netware running under AT&T's Unix System V, Release 3, which reportedly will enable simultaneous support of Netware and Unix tasks for DOS, OS/2, Apple Computer, Inc. Macintosh and Unix clients. It is expected to ship in the first quarter of 1990.

Further, the vendors will jointly develop a series of value-added software to include CCITT X.400 mail products, Sun Microsystems, Inc.'s Network File System gateways, Unix client software, remote procedure calls for distributing applications and CCITT X.25 protocols. Prime is also trying to position itself as a provider of customized Unix ports of Netware.



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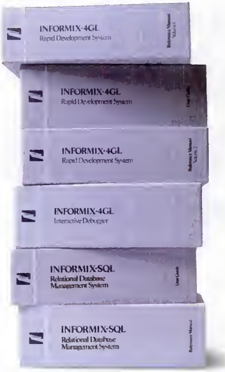

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Systems holes dim thrifts' silver lining

BY ROBERT MORAN
CW STAFF

Large commercial banks with the systems wherewithal hope to profit from increased opportunities in the mortgage business that, observers said, will spill over from the Bush administration's plan to rescue thrift institutions.

But to compete in the mortgage business, commercial banks will have to avoid a major shortcoming of all but the most sophisticated thrift institutions — inadequate systems for servicing mortgages, according to George DiNardo, executive vice-president at Mellon Bank NA.

These systems, called pipeline analysis systems, enable banks to measure their commitments against changes in mortgage rates.

"If rates are in for a period of instability, the bank can make or lose a great deal of money, depending on what is in that pipeline," said Henry Garcia, senior vice-president and manager of corporate strategic systems at Citizens & Southern National Bank in Atlanta.

Like the thrifts, not all commercial banks are equipped with the systems, DiNardo said. Generally, only large regional banks and multistate holding companies have such systems, Garcia said.

But practices in the mortgage business vary. Citizens & Southern groups mortgages and sells them to an underwriter, a process called securitization.

Tracking the various methods in securitizing is in many ways analogous to MIS procedures in bond trading, according to Garcia.

"For a small bank or a bank that has been trading or issuing mortgages from its own portfolio," Garcia said, "securitization would require a significant MIS investment."

IBM

CONTINUED FROM PAGE 1

However, in late 1987, IBM decided not to go to market with the product, sources said, but continued the project with GE to provide a customized application. An internal audit called for by Joseph Guglielmi, president of IBM's Application Systems Division, found the project over budget and behind schedule, according to a source involved in the project. The finding resulted in a write-off of nearly $70 million and the transfer of some IBM staff, according to that source.

Two sources involved in the project said they were informed that IBM invested $100 million. An IBM spokesman declined to comment, saying the company "never publicly announced that project."

The effort was seen by some software vendors, most of whom asked not to be named, as a move by IBM to dominate the DB2-compatible accounting software market, displacing such traditional players as Management Science America, Inc. and McCormack & Dodge Corp.

Since then, IBM has announced agreements with accounting software vendors M&D and Walker Interactive Systems to jointly market their accounting packages that work with DB2. And with the creation of the Application Systems Division last year, IBM has focused its software efforts on specific applications such as office automation and manufacturing.

Washout

According to a source close to the project at GE, IBM continued the Whitewater effort for GE with the intention of resurrecting it as a commercial product if the problems could be resolved. But recently, according to industry sources, IBM and GE agreed to terminate the project. A GE spokesman declined to comment on *Computerworld's* inquiries last week.

Sources at both M&D and MSA said that IBM approached them last year looking for someone to take over the software in what was an apparent effort to recoup its investment.

John Imlay, chairman of MSA, acknowledged that his firm was approached by IBM to look at the software about a year ago. Imlay said that in discussions with IBM at that time, he urged IBM to foster relationships with software vendors and focus its resources on targeted areas.

A complete suite of applications was planned, including ones in such areas as general ledger, accounts payable, fixed assets and personnel. A similar project was reportedly undertaken to upgrade IBM's Communications-Oriented Production Information and Control System manufacturing application. The software was to incorporate advanced features such as the ability to do asynchronous batch and on-line processing simultaneously, but the software coding was too massive and resource-consumptive to be effective, according to the sources involved in various stages of the project.

Many of the problems plaguing the project stemmed from the use of IBM'a Cross System Product (CSP), a source said. The Whitewater applications were developed using CSP in conjunction with a special version of Andersen Consulting'a Workbench product, which integrates DB2 and CSP.

CSP has garnered little support from customers and third-party developers.

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UK staffing woes linked to salaries

BY HELEN JONES
IDG NEWS SERVICE

LONDON — The UK government is finding it increasingly difficult to recruit and keep information technology staff because it cannot compete with salaries in the private sector, according to a report published by the UK's Society of Information Technology Managers (SOCITM).

Of the nearly 14,500 computing posts in local government, 10% were vacant in 1988. The report revealed that information technology managers expected about 700 trainees to be recruited in 1988-89, a drop of 13% over the previous year. However, spending on training is low, and SOCITM fears that the skills shortage will worsen.

A spokesman for Nalgo, the UK trade union that represents many local government workers, said, "The report doesn't surprise us. In computing, some of the salaries are an absolute joke compared to the private sector. Local authorities are simply tied to local-authority pay scales."

Short supply

John Elliott, PC director at National Magazine Co. and a former local authority worker, said, "The grading structure means that computer managers are paid the same as accountants. You can get accountants, but computer staff are in short supply, and there are no incentives like company cars."

Roy Barnes, director of Lamsac, the local-authorities user group, agreed: "London boroughs in particular are finding it very hard. They lost a lot of staff after the 'big bang,' and salaries have fallen behind house prices."

Some local authorities have introduced schemes to deal with the problem. The London boroughs of Lambeth and Lewisham now offer top benefits in an attempt to attract computer staff.

More strategies

SOCITM's report also indicates that the percentage of local authorities with a formal computing strategy rose from 53% in '87 to '88 to 62% in '88 to '89.

The majority of personal computers are used for word processing, but spreadsheet use is increasing, with 42% of respondents claiming considerable use.

Only five local authorities are regularly using desktop publishing, but 86% said they expect its use to be significant in the next two years, according to the report.

Amdahl boasts of better ESA

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. claimed last week that when its version of IBM's MVS/ESA operating system becomes available late this year, it will outperform IBM and its performance will increase over time while IBM's will decrease.

Analysts were not surprised at the company's claims, made by Amdahl President Joseph Zemke. John Jones, an analyst at Montgomery Securities, Inc. in San Francisco, said the claim is consistent with the views of the analyst community. Peter Labe, an analyst at Drexel Burnham Lambert, Inc. in New York, said that claiming a better implementation of MVS/ESA was "neat."

Zemke said that while "IBM did a good job on ESA . . . they're really stretching what ESA is today."

He said that performance ratings performed internally found less performance increase than IBM has claimed on its new operating system.

In an information management system environment on an IBM 3090 Model 600E, Amdahl found a 6% to 8% performance increase, according to a spokesman. IBM claimed last year that the performance on a 3090 E would increase 10% to 12%.

IBM would not discuss Amdahl's claims, but a spokesman said that the company had documented a 56% gain in performance in an information management environment using a 3090 Model 600S, the company's biggest mainframe with main memory identical to the 600E used by Amdahl.

MVS/ESA compatibility has not been easy or cheap for Amdahl, accounting for a significant chunk of its research and development expenses and an introduction date set for nearly 18 months after operating system specifics were available. "We chose not to go quickly and move things into micro and macro code," Zemke said.

> "AS IBM rolls [ESA products] out, it will raise memory size, and there's some ponies in there for us."
>
> JOSEPH ZEMKE
> AMDAHL

Users may not believe either side's claims, but it is clear that to get maximum performance from the new operating system, more money will be spent on more memory.

"As IBM rolls [ESA products] out, it will raise memory size, and there's some ponies in there for us," Zemke said, referring to the opportunity to sell Amdahl controllers and storage devices.

Discounts

While the company may see opportunity for increased sales in memory devices, its CPUs have been discounted an average of 16% over the last year, Zemke said. He said that in response to IBM Credit Corp. discounting, there currently represents a "very aggressive" discounting situation.

Amdahl also trumpeted record sales for the year, totaling $1.8 billion, up from $1.5 billion in 1988. However, Ed Thompson, chief financial officer, said he expected sales to decline in 1989.

Amdahl spent some $30 million of that money in stock buys to acquire Key Computer Laboratories, Inc. in Fremont, Calif. The acquisition, which was announced earlier this month, is unusual for Amdahl because its technology is most often developed in-house.

Zemke said that the company was important because it was developing scalar and parallel architectures, which he thinks will play more of a role in mainframes in the future.

Currently, parallel architecture is primarily reserved for scientific applications in supercomputers.

MCI files protest to AT&T federal contract

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — MCI Communications Corp. sicced its lawyers on AT&T again last week by filing an official protest to AT&T's contract for 60% of the government's Federal Telecommunications System (FTS)-2000 network.

In a complaint filed with the General Services Administration's Board of Contract Appeals, MCI said AT&T failed to meet government specifications because the AT&T tariff for the private network is illegal.

MCI, the loser in a three-way battle for the FTS-2000 job, said AT&T's portion of the $3 billion to $15 billion contract should be terminated. The 10-year contract, awarded Dec. 6, 1988, gave 40% of the intercity network to U.S. Sprint Communications Co.

The MCI complaint is an extension of a battle under way at the Federal Communications Commission over the legality of AT&T's Tariff 16, which was designed for competitively bid government networks including FTS-2000.

MCI said the tariff is illegal because it does not publicly reveal the price of the service and it applies only to a single customer.

AT&T spokeswoman Edith Herman said the MCI protest is without merit because the tariff fully complies with the FTS-2000 specifications. She said the prices have been filed with the FCC but added that AT&T refused to disclose the pricing in public documents because that would put the carrier at a competitive disadvantage in four years when AT&T and U.S. Sprint compete for a larger share of the total network.

MCI contended that AT&T could use Tariff 16 to abuse its market power by underpricing its government services, subsidizing these services with revenue from other ratepayers and trying to drive MCI out of business.

Eastern bloc groups hot about MAP

IDG NEWS SERVICE

BUDAPEST — The Hungarian MAP Users Group (HMUG), established to promote standards based on Manufacturing Automation Protocol (MAP) in Hungary, announced that it intends to cooperate with similar MAP user groups throughout the world.

The group met this month with delegates from Eastern Bloc countries including the USSR, Poland and East Germany to prepare a constitution and define common goals of the newly created East European MAP Interest Group, or EEMIG, which is similar to the UK's EMUG, Canada's CMIG and Australia's AMIG.

According to HMUG, the larger group will inform its users of information revelant to protocols for factory and office automation based on international standards such as MAP and Technical Office Protocol.

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Alverno College, Milwaukee	Siemens EWSD	Basic	Wisconsin Bell	Started March 1988, ends 1989	Trial.
American Express, Phoenix, Ariz.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started July 1988	First customer of AT&T's Primary Rate
American Transtech, Jacksonville, Fla.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started Dec. 1987	Beta test site for AT&T's Primary Rate
Arizona, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1986, officially ended	
Boeing Co., Seattle	AT&T 5ESS	Basic	US West Communications	Scheduled start Nov. 1988	
Carnegie Mellon University, Pittsburgh	AT&T 5ESS	Basic		Contract pending	
Chevron Corp., San Francisco	Northern Telecom SL-100/ DMS-100	Primary/Basic	Pacific Bell	Installation underway	
Contel Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer
Control Data Corp., Minneapolis	NEC NEAX 61E	Basic	US West Communications	Started Nov. 1987, ends Nov. 1988	Trial
Duke University, Durham, N.C.	AT&T 5ESS	Basic	Southern Bell		
Eastman Kodak Co., Rochester, N.Y.	Northern Telecom SL-100 PBXs	Primary		Started Aug. 1988	First Primary Rate using two SL-100s
Federal National Mortgage Assoc., Washington	AT&T 5ESS	Basic	C&P Telephone	Started June 1988	
First Data Resources Inc. (American Express subsidiary), Omaha, Neb.	Northern Telecom SL-1 PBX and AT&T 4ESS	Primary	AT&T	Unannounced	
Glaxo Inc., Research Triangle Park, N.C.	SL-1 PBX and DMS-100	Primary/Basic	GTE South	Started June 1988	First Primary Rate/Basic Rate in one trial.
Hardees, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Carolina Telephone	Scheduled start Jan. 1989	
Hayes Microcomputer Products Inc., Norcross, Ga.	AT&T 5ESS AT&T 5ESS	Basic Basic	Southern Bell Pacific Bell	Started April 1988 Sept. 1987 to Sept. 1988	Using ISDN to develop ISDN products.
Hershey Foods Corp., Hershey, Pa.	AT&T 5ESS	Basic	Contel of Pennsylvania	Scheduled start Oct. 1988	Will include ISDN satellite transmission.
Honeywell Information Systems (Honeywell Bull), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included data/voice transmission between office and employees at home.
Intel Corp., Chandler, Ariz.	AT&T 5ESS	Basic	US West Communications	Started Feb. 1987, ended Aug. 1987	Trial
Johns Hopkins Medical Center, Baltimore	AT&T 5ESS	Basic	C&P of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif	AT&T 5ESS	Basic	AT&T Federal Systems		
Lockheed Missiles and Space Co. Inc., Sunnyvale, Calif.	AT&T 5ESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1988	Trial
Mass. Institute of Tech., Cambridge	AT&T 5ESS	Basic		Scheduled cutover Oct. 1988	Using AT&T 5ESS as PBX for private network.
Mather Air Force Base, Sacramento, Ca.	AT&T 5ESS	Basic	AT&T Federal Systems	Started Aug. 1988	Model for ISDN deployment at 50 bases
McDonald's Corp., Oakbrook, Ill.	AT&T 5ESS	Basic	Illinois Bell	Started Dec. 1986	
McDonnell Douglas Corp., St. Louis		Primary	AT&T	Unannounced	
Microcom Inc., Norwood, Mass.		Basic	New England Telephone	Installation underway	Part of centrex contract.
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Illinois Bell	Planning stage	
NASA, Washington	AT&T 5ESS	Basic	AT&T Federal Systems		
Nice Corp., Ogden, Utah.	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN.
North Carolina State Univ., Raleigh	Northern Telecom DMS-100	Basic	Southern Bell		
Northeast Utilities, Hartford, Ct.	Northern Telecom SL-1s	Primary			PBXs in Rocky Hill Ct. and Meriden, Ct.
Pennsylvania, State of, Harrisburg	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Statewide network with ISDN in Harrisburg.
Pratt & Whitney, East Hartford, Conn.	AT&T 5ESS	Basic	SNET		
Prime Computer Inc., Natick, Mass.	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer
Rockwell Communication Systems, Richardson, Texas.	AT&T 5ESS with two remotes.	Basic	Southwestern Bell	Scheduled start Dec. 1988	40 buildings in a campus environment will be linked via ISDN.
Shearson Lehman Hutton Inc., New York	AT&T 5ESS	Basic	New York Telephone	Started June 1988	Part of 8,000 line centrex contract.
Shell Oil Co., Houston	AT&T 5ESS	Basic	Southwestern Bell	Start Sept. 1988	Plan to use 5,000 ISDN lines.
Southern Methodist University, Dallas	Siemens EWSD	Basic	Southwestern Bell	Started Feb. 1988	
SunTrust Service Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer
3M Corp., St. Paul, Minn.	AT&T 5ESS	Basic	Southwestern Bell	Started Aug. 1988	Plan to use 3,165 ISDN lines.
Tenneco Inc., Houston	AT&T 5ESS	Basic	Southwestern Bell	Started June 1988	Plan to use 3,900 ISDN lines
Texas A&M University, College Station	GTE GTD-5 EAX	Basic	GTE Southwest		
University of Arizona, Tucson	AT&T 5ESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T 5ESS as PBX in private network.
University of Connecticut, Storrs	AT&T 5ESS	Basic	SNET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
University of Maryland, College Park				Unannounced	
University of South Florida, Tampa	AT&T 5ESS		GTE South	Started Oct. 1987	
U.S. Dept. of Treasury, Wash.				Contract pending	
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Trial
Virginia, State of, Richmond	AT&T 5ESS	Basic	C&P of Virginia	Started April 1988	
West Virginia University, Morgantown	AT&T 5ESS	Basic	C&P of West Virginia	Scheduled start Dec. 1988	Plan to use 660 ISDN lines.

Note: This chart was compiled by *CommunicationsWeek* with information provided by Teleos Communications Inc., Eatontown, N.J., as well as from news releases and published reports. Carriers, switch manufacturers and their affiliated laboratories are not listed

The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

95% of ISDN lines are on an AT&T 5ESS® switch.

AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—95% of non-trial ISDN lines. What's more, we've already shipped over 200,000 ISDN lines for future use. Today, 99 central offices can offer operational ISDN services over the AT&T 5ESS switch, with a total of 415 upgraded with ISDN software.

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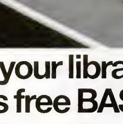

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Future success will depend on software

IBM WATCH

GEORGE SCHUSSEL

Twenty years ago, IBM launched its independent software industry by unbundling applications and systems software from hardware offerings. Despite the growth of the industry since then, IBM is by far the largest software organization in the world, with annual sales of approximately $10 billion.

In fact, IBM's dominance in software is greater than in hardware. Prominent competitive independent software vendors such as Cullinet and Oracle boast sales of a few $100 million per year. Computer Associates, the largest independent software vendor, has an annual revenue of only about $1 billion — and much of that from acquisitions.

Further, software is fast becoming IBM's most important business. In order to meet growth and profitability goals, the company needs to do well in its software sales, because software sales drive the hardware sales, and its other businesses are not doing as well.

PC market share waning

For example, IBM's share of the personal computer market is rapidly declining. At its highest point in 1986, IBM held more than 50% of the U.S. business market.

In minicomputers, IBM's market share has eroded drastically since the early 1980s. Much of this erosion has been in favor of DEC. Although IBM is successfully fighting back with the Application System/400 series, new competition is going to come from various suppliers of Unix-based computers.

In mainframes, IBM's 370 series (3090, 4381, 9370) remains dominant. However, the overall growth in the mainframe market recently has been less than 10% per year.

There is an essential interaction between the success of a software product and the resulting sales of the underlying hardware. The 1980s success of the IBM Personal Computer was principally the result of the popularity of Lotus' 1-2-3. Much of the current success of IBM's AS/400 line is attributed to the availability of thousands of applications software packages from the System/36 and 38 markets.

Software, then, is not only the most rapidly growing piece of IBM's business, but it is the piece that drives the success of the hardware business. It is also the business that is likely to give IBM its largest operating margins. Software and services revenue is expected to climb to half of IBM's total income by the early 1990s.

The best evidence indicating that IBM recognizes this trend is its commitment to Systems Application Architecture (SAA). A principal goal for SAA is to counter DEC's inroads into IBM's user base by offering the same flexibility advantages previously available from DEC and its VAX line of computers. DEC has achieved portability of applications for its customers by migrating one operating system to a variety of computers.

IBM hopes to achieve the same type of benefit for its customers through the different technique of supporting products that operate comparably over a variety of different operating systems and hardware architectures.

To the extent that SAA is able to increase the number and diversity of computers that run compatible software, it will make the IBM environment even more attractive to independent software vendors than it has been in the past. Since software availability has become more important than hardware price/performance for many users, the end result of this scenario is more hardware sales for IBM.

Another important goal of SAA is to simplify the migration of PC users upward into the world of IBM mainframes. This decade has witnessed the education of at least 15 million PC users.

SAA could spell success

Because SAA's user interface will come from the Personal System/2's Presentation Manager, it is clear that this strategy has a good chance of succeeding. Since instruction cycles sell for much more money on mainframes than PCs, the graduation of many users from PCs to mainframes will offer IBM the opportunity to profit from greater sales of large and expensive computer systems.

IBM's future is likely to be governed more by acceptance of its software products than ever before. SAA and related offerings will be the major determinants of IBM's fortunes in the software market.

SAA is likely to be a major success, although it will take until the mid-1990s for it to make a significant impact on IBM users. It will be a major factor in marketing decisions well before then, however.

Schussel, president of Digital Consulting, Inc. in Andover, Mass., is a lecturer and futurist. He chairs The Database Cooperative Processing Symposium, Software Futures, 4th and 5th Generation Data Management Software and Unix Futures conferences.

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EDITORIAL

Bleeding edge

RECENTLY, WE RAN a chart outlining the total annual cost of owning a personal computer in the corporate world [CW, Jan. 23]. Starting with fully configured hardware at a cost of about $3,000, you need to add a whopping $15,000 to that in terms of software, support, training and so on to arrive at the real first-year cost. Amazing, no?

For the most part, corporate buyers have been willing to pay premium prices for hardware from leading vendors. But as budgets come under tighter scrutiny, the temptation to cut a buck here and there on hardware will increase.

If this happens in your company, tell your boss about Leading Edge, the king of the low-cost clones. It seems that dealers were so hot for this company's machines that they fronted it millions of dollars in advance of delivery. The problem now is that delivery just isn't being made, and the company is on the verge of being sold to a suitor.

What might happen to support for the thousands of Leading Edge machines installed? Maybe nothing at all. But there's a couple of lessons here for corporate PC customers weighing relative costs of hardware from different vendors: Hardware "discounts" can be illusory, and if it looks too good to be true, it probably is.

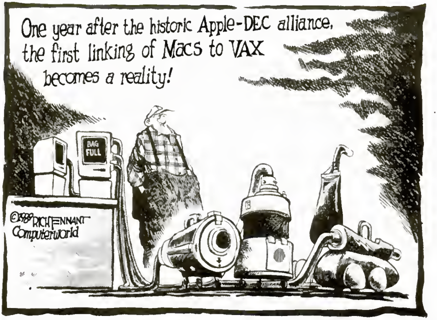
Super reality

No one is ready to say the last rites over the graphics supercomputer market, but its slow start raises some thought-provoking questions. These high-powered graphics engines raised quite a stir last year with promises of packing 40 million instructions per second into a deskside unit. With a six-figure price, they weren't cheap, but what technology!

Now, reality has hit. Bogged down by communications bottlenecks, software shortages and suddenly price-sensitive customers, graphics supercomputers are trickling into user sites. Some pundits think the market may dry up completely.

It would be easy to blame this frosty reception on the $100,000 or more that manufacturers are charging for these machines. But that wasn't a barrier for the workstation market three years ago when that price bought only a fraction of the power. Rather, it seems that graphics supercomputers are suffering from an excess of MIPS. The power is there, but the applications that take advantage of it are not. Why buy 40 MIPS when you only need 5?

A 1988 *Computerworld Extra* on productivity brought home the message that users are taking a harder look at their computer spending. They are beginning to ask how much the computers they buy enhance their productivity. The slow start of OS/2 is only one indication that applications — not raw power — are driving the buying decision. Graphics supercomputers are another. For all their glitz, they may just be too much, too soon.


One year after the historic Apple-DEC alliance, the first linking of Macs to VAX becomes a reality!
BAG FULL
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LETTERS TO THE EDITOR

Avoiding jargon

In the Forecast '89 article "CIO's lives are turned topsy-turvy" [CW Dec. 26/Jan. 2], I was struck by some comments on the need for CIOs to become more conversant with the business they work for and to communicate with their non-IS colleagues without using technical jargon.

In 15 years in the MIS field, my primary focus has always been aiding other departments in the development of solutions to business problems. I did not feel that I could adequately provide this assistance without understanding the general business of the company.

The same applies to the communication issue. I strive to avoid the use of technical language whenever I can. I try to learn the jargon of the other people so that I can understand what they are saying if they happen to use those terms in our conversations.

If there are IS managers and professionals out there who do not approach their jobs this way, then surely they need to change. I find it very hard to believe that this is the case.

Still, the fact that it happens at all is a problem, and certainly those who wish to advance their careers, especially those with an eye on CIO positions, should strive to learn these two basic skills. The ability to understand the business and the ability to communicate clearly and effectively will be hallmarks of the successful IS manager and professional in the next decade.

David Ray Fuller
Senior Systems Analyst/ Consultant
Prodata, Inc.
Boise, Idaho

The real world

The Executive Report on MIS in Education [CW, Jan. 9] reflects the longtime continuation of a sad problem in academia that has moved into the data processing world.

For far too long, our universities and colleges have proliferated inefficiencies and waste in the name of education. Undisciplined philosophical theoreticians with little worldly experience teach exotic solutions to students. These students then get jobs in the industry and suffer future shock when encountering such terms as justification, controls and profitability.

As one who specializes in EDP auditing and security, I have always been amazed at how easy it is to find shortcomings pertaining to controls and security in the world of academia, yet how obstinate alleged collegiate administrators are in finding them and forcing amelioration among the professors working on meaningless projects. It is time the world of academia joined the real world and taught students to live in the mainstream. Business needs people who can apply computers to solve real-world business problems. We do not need wild techies offering idealistic solutions learned from professors hiding from the real world.

Richard A. Katzman
President and Principal
R. A. Katzman Associates, Inc.
New Cumberland, Pa.

Generic approach

Regarding the letter of Gopal Kapur [CW, Dec. 5], he should have asked this question instead: "Can one successfully design and implement a large system from detailed requirements?"

Systems designed using detailed requirements rarely survive when the business changes. At best, the data model remains, but the application logic must be redone.

By the time requirements are collected, they are hopelessly out of date. In addition, without a common language between users and developers, validation of such requirements is difficult, at best.

Assumptions, misunderstandings and design shortcomings become visible only when the system is in integration testing — in many cases, far too late to correct the situation.

The alternative approach is to design a generic system using a generic set of specifications. With some variations, the following strategy is used:

- Focus on recognition of design patterns and generalization of the problem, thus making a solution for a specific problem reusable for other problems.
- Use foundation software to reduce complexity of the project.
- Create nonprocedural logic components.

The systems built using these concepts adapt easier to changes in business policies. In most cases, to accommodate policy changes or implement new policies in such systems involves reconfiguring the data without modifying the application logic.

Alex Mittelman
Scottsdale, Ariz.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Clips from *The Takeover Times*

PAUL COLTON

The hottest entertainment in the U.S. today appears on the business pages of your local newspaper. Yes, folks, *Takeover Wars* is raging in a daily fix of greed, gall and gumption — all the ingredients of a box-office smash.

Unfortunately, just as *Top Gun* dominated the imagination of moviegoers to the detriment of other worthy films, so too has the RJR Nabisco, Inc. scuffle overshadowed takeover battles of smaller, less well-known companies. The following wire service stories, chronicling one such battle between computer firms, probably never made your paper at all.

(Oct. 5, 1988) WESTON, Mass. — Bentsen Archer, president of Remora Systems, Inc., has announced a $10 per share tender offer for Mako Computers, Inc. Only one-quarter the size of Mako, Remora is using junk-bond financing to try to gobble up the 12-year-old Mako in an unfriendly takeover bid. Mr. Archer stated that the business combination of the two companies "would result in a bigger company."

(Nov. 14, 1988) AUSTIN, Texas — Mako Computers, Inc. Chief Executive Officer Greg McIntosh announced today that the Mako board of directors has rejected the $10 per share offer of Remora Systems, Inc. "The Remora offer is clearly inadequate in that it does not recognize the value of Mako's greatest asset — its employees." To boost the stock price of Mako shares, he also announced cost reductions that will result in the layoff of 10% of its work force.

(Nov. 18, 1988) WESTON, Mass. — Remora Systems, Inc. President Bentsen Archer announced that he has raised his offer for Mako Computers, Inc. to $13 per share and has extended the tender offer until Nov. 30, 1988. Mr. Archer stated, "The cost-cutting measures undertaken by Mako make its stock more attractive than previously, and I am confident that an additional 5% can be trimmed from the payroll due to redundancies which will result from the merger of our firms."

(Nov. 28, 1988) AUSTIN, Texas — In response to the new tender offer and cost-cutting plans of Remora Systems, Inc., Mako Computers, Inc. Chief Executive Officer Greg McIntosh vowed to increase layoffs to 20% of the work force and to close its San Antonio support center. "These actions will increase Mako's value by reducing expenses and unnecessary overhead related to fixing bugs and such," Mr. McIntosh commented.

(Nov. 30, 1988) WESTON, Mass. — Countering the latest defensive plan by Mako Computers, Inc.'s Greg McIntosh, Remora Systems, Inc. has raised its per-share offer for that firm to $25 and ". . . would lay off in excess of 50% of Mako's employees," Bentsen Archer said. "In addition, we will close all buildings with more than two floors. This action will make a combined Remora/Mako a leaner and meaner firm and, best of all, it soon will be all mine."

(Dec. 3, 1988) AUSTIN, Texas — As the takeover war heats up, Mako Computers, Inc. Chief Executive Officer Greg McIntosh has once again outmaneuvered archrival Bensten Archer. Mr. McIntosh's newly revealed plan is to lay off all Mako employees with fewer than 11 years of service and to close all buildings not located in a sunny climate. In a carefully worded statement read to the press this morning, Mr. McIntosh said, "The reduction of nonessential personnel and facilities will substantially improve Mako's profitability over the next six hours and convince stockholders that the intrinsic value of Mako shares is greater than the $25 offered by that scum Archer."

(Dec. 5, 1988) WESTON, Mass. — The Archer/McIntosh war reached boiling point today as Remora Systems, Inc. increased its latest offer to $50 per share and committed itself not only to lay off the entire Mako Computers, Inc. work force, including Chief Executive Officer Greg McIntosh, but to close all facilities. In addition, Remora President Bentsen Archer stated his intention to donate all remaining Mako assets to the Salvation Army. "These measures," Mr. Archer said in a terse press release, "should put that bootlicking McIntosh in his place once and for all."

(Dec. 6, 1988) AUSTIN, Texas — In a desperate attempt to save his company from the clutches of nemesis Bensten Archer, Mako Computers, Inc. Chief Executive Officer Greg McIntosh announced that he has traded all Mako assets to Public Service Company of New Hampshire for the Seabrook nuclear reactor. "I feel that the future of Mako is better served by overcharging energy consumers than by processing information," he said. "Best of all, I plan to dispose of Seabrook waste products in Weston."

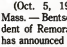
(Dec. 7, 1988) NEW YORK — Wall Street reacted favorably to recent developments in the Remora Systems, Inc./Mako Computers, Inc. takeover battle, pushing Mako stock to an all-time high.

MICHAEL HARRIS QUINT

Colton is a product manager at a Boston-area computer company.

In workstation wars, how large is enough?

AMY D. WOHL



Just when you thought you had convinced your eager troops that they don't really need giant new personal computers or OS/2 yet . . .

Just when you finally fought off the Big Mac attack with promises of Apple Computer, Inc. Macintosh-like interfaces on more standard hardware . . .

Now it turns out the battle really is not over. The next round of the workstation wars is warming up.

When Sun Microsystems, Inc., Apollo Computer, Inc. and Digital Equipment Corp. speak of workstations, they do not mean whatever happens to be on your desk as a local information access device. They mean serious machines.

However much power a PC offers, a workstation always offers or promises more. Workstations are marketed based on speed and raw power. Often, they use such advanced technology as reduced instruction set computing (RISC) processors.

Not for us

In the office, we did not need to pay much attention to workstations. They were geared to the needs of the scientific and engineering community and to processor-hungry applications such as graphics and publishing.

Applications software for workstations — usually based on Unix operating systems — was sketchy. Aside from the niche-market applications, most Unix workstation software focuses on tools for the development of software and often avoids commercial, mainstream turnkey business applications.

But the scientific and engineering marketplace is small relative to the front office, which became computerized with the availability of inexpensive PCs and software. As the workstation market became more competitive, it was perhaps inevitable that its vendors would lust for bigger worlds to conquer.

Recently, DEC announced its Vaxstation 3100, which is intended for the office. What kind of office, you might ask, needs a VAX on the desktop? And how much would you pay for this robust environment?

We priced a 3100. Bundled with the VMS operating system and DEC's new Decwindows graphical user interface, it costs $7,950 plus $2,850 for a 52M-byte hard disk drive. But with 8M bytes of memory, $10,800 is only a little pricey. Clearly a VAX VMS user could justify such a workstation in the right application.

This machine is especially likely to be one that is closely integrated with other VAX environments and existing VMS software. In the office, the universal application is word processing. No matter what else you do — from data bases to communications — you will have to write some notes or reports.

DEC is almost ready to ship a Decwindows word processor called Decwrite. It looks sort of like today's new word processors, with a Mac-like interface, integrated text and graphics and typeset-like appearance.

Then look at the price. DEC somehow thinks you will pay $1,500 to equip your $10,800 workstation with a word processor. That comes to a pricey $12,300 to emulate a word processing environment for which an Intel Corp. 80386 clone, Microsoft Corp. Windows or IBM Presentation Manager and a $500 next-generation PC word processor would easily suffice.

Just in case your love affair with Lotus Development Corp.'s 1-2-3 is over, DEC will sell you its Decwindows spreadsheet, Decdecision, for another $1,000. DEC does throw in a free copy of its business graphics software with both Decwrite and Decdecision, but we cannot imagine too many PC users foregoing their familiar environments to buy these products.

Cheap by comparison

Minicomputer manufacturers generally overvalue and overprice their personal workstation software. A price that is high for the PC market still seems cheap to them when compared to the multiuser products they sell. This perception usually means the mini vendors price their software entirely outside the desktop mainstream, too.

We know that the power of a VAX, however small, is greater than that of any PC. We noticed and liked the compatibility of DEC's Vaxstation 3100 with other VMS-based products but doubt that many of them need to play on the office desktop. And we could not help regretting that VMS products do not yet have compatible interfaces for Decwindows, in any case.

In a few years, users in volume may demand — and move to — more robust PC/workstations with friendlier, graphical user interfaces and transparent connectivity to all types of multiuser computing environments. But I do not believe a move to a single operating system or a doubling of workstation costs will be accepted to do so.

In the mainstream market, economies of scale will permit high-end PC prices to decrease rapidly. This trend is unlikely to occur on the same scale in the smaller market for workstation products. More important is the availability of abundant software. Such abundance occurs when an operating system standard is agreed to and prosperity attends developers who write to it.

Which standard next-generation PCs and workstations will be designed to follow is not yet known, but we suspect that it will be determined in the mass market by users and not by the desire of workstation vendors to expand their available market to the office desk.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

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SYSTEMS & SOFTWARE

HARD TALK

Rosemary Hamilton

Making the best of Wang

Earlier this month, Wang Laboratories was laughed at and called crazy by some industry analysts when it introduced its high-end minicomputer, the VS10000, and compared it to the low-end IBM 3090 mainframes.

One analyst said Wang didn't have a chance, simply because nobody considers the company to be real competition in the high end of the market. The analyst's opinion was offered without his having been briefed on the product. He only knew that Wang had introduced a high-end box.

But his opinion was echoed by other consultants and Wall Street analysts who had reviewed the announcement. Still others said they could not comment because they don't bother to follow Wang's activities anymore.

Now, that is certainly tough for Wang to hear. But forget about the company for a second. Imagine what it must feel like to be a Wang customer and know that your vendor gets no respect.

So I asked some Wang users what that's like. The people I

Continued on page 31

Ocean Spray rolls

Relocating took two years to plan, three days to do

ON SITE

BY JAMES DALY
CW STAFF

LAKEVILLE, Mass. — A tangle of thick silver cables resembling a viper's nest lies in one corner. Drills whine. Wooden boxes filled with tape cartridges line a wall.

An MIS manager's nightmare? Not this time. It is more like an MIS manager's dream. Then again, it is probably wise to expect a little organized chaos when moving a data center.

That is just what Ocean Spray Cranberries, Inc. got when it moved a data center full of computer equipment from its old headquarters in nearby Plymouth, Mass., down the road to a new corporate headquarters during the recent Martin Luther King Jr. holiday weekend.

Although the move took only a few days, the preparation for moving the center began nearly two years ago, said Tom Modestino, now in his fifth year as director of MIS at the firm. When the announcement went out that Ocean Spray would be moving its headquarters from a converted clam factory to the new 310-acre site, Modestino knew he would have his work cut out for him.

The Ocean Spray data center is responsible for the operation of four IBM and Wang Laboratories, Inc. CPUs, as well as the monitoring and controlling of a communications network and all systems and software support. The central data network links the central headquarters with seven processing plants, 10 packing locations and a series of regional sales offices.

From a converted clam factory *into a new headquarters*

But in the end, the logistics were irrelevant. "When it came down to it, I had only one real goal: The system had to be up and ready for business when the workers returned Tuesday morning — period," Modestino said.

Since the building design was

Continued on page 31

Encore claims to best supermini competitors

BY JAMES DALY
CW STAFF

MARLBORO, Mass. — Encore Computer Corp. promises to roil the waters of the superminicomputer world today when it announces a pair of symmetrical multiprocessing systems that Encore claims will reach processing speeds as fast as 170 million instructions per second (MIPS).

The two-model Multimax 500 family will share the limelight with Encore's Extended-Performance Processor Card (XPC), which utilizes the National Semiconductor Corp. NS32532 microprocessor and powers the Unix-based Multimax 510 and 520.

"We're going straight up against the traditional supermini vendors — Prime, Data General, HP, DEC — because we feel this is a significant opportunity there," said Encore director of commercial marketing Tom Doyle.

Essential to this challenge is

Continued on page 32

Distributed DBMS means cost, trouble

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — What did you know, and when did you know it?

That question, which recalls the Watergate hearings 15 years ago, might well apply to the manager of a truly distributed database. That is because distributing the task of data processing forces a corporate network to retain just one image of a geographically fragmented database management system, even though pieces of data will be generated at different points in space and time.

While industry analysts questioned at the recent Database '89 here disagreed about the attributes of a fully distributed DBMS, they agree on one thing — it does not yet exist. Yet ven-

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Inside

- The standard work unit won't go away as long as SQL is around. Page 29.
- Saavi works on people issues. Page 29.
- Managing DB2 catalogs. Page 40.

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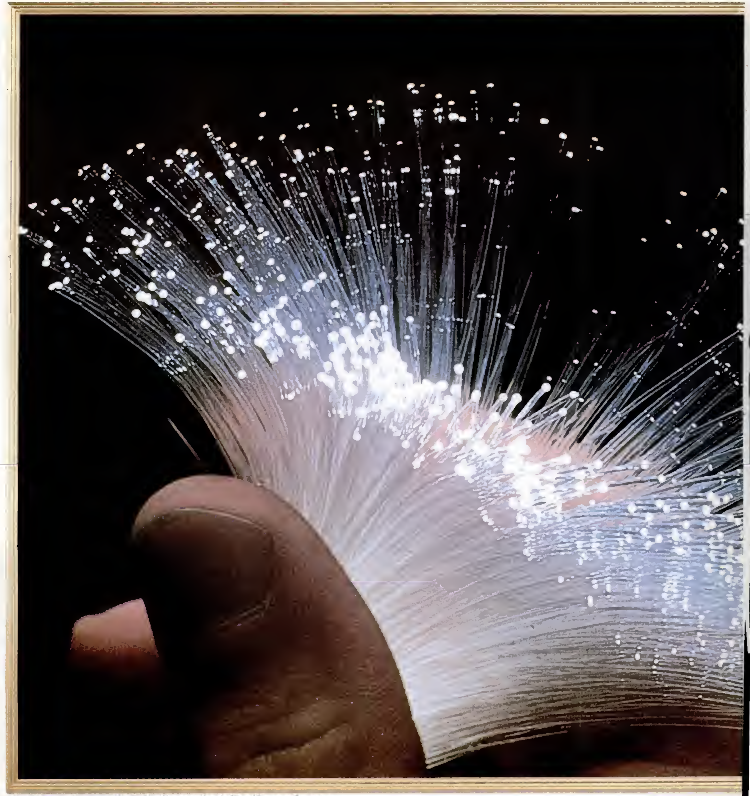

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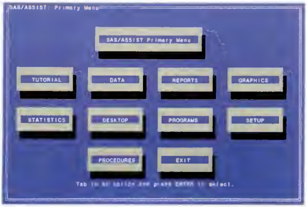

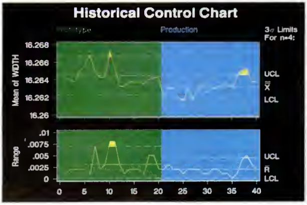

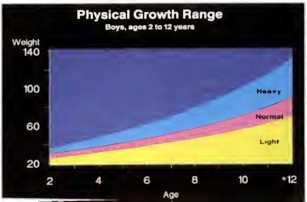

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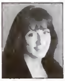
SOFT TALK

Amy Cortese

Just another excuse for a Unix party



Despite the glamor of the Plaza Hotel and an international satellite broadcast linking New York and Brussels, Unix International's official coming-out party in New York last week was anticlimactic. Indeed, it was a bore.

Not that the formation of the group is insignificant. On the contrary, it ushers in a more cooperative way of creating software. It is just that it was a rehash of the previously expressed views of AT&T and its licensees.

The Archer group, the band of AT&T Unix System V licensees that was the forerunner of Unix International, first announced its intent to form a group to advise AT&T's Unix development in September. So, nearly four months later, a press conference was staged to state that they did in fact form a group.

Although some executive appointments (mostly temporary) and an organizational structure were divulged, there were not a lot of compelling reasons for traveling to New York — unless you count seeing what Donald and Ivana have been up to with the Plaza. (I'm happy to report that the Trump name was not emblazoned in neon on the venerable exterior.)

Continued on page 33

Getting the most out of SQL

ANALYSIS

BY WILLIAM INMON
SPECIAL TO CW

The standard work unit, or SWU, has been around as long as there has been high-performance processing.

There is no sign that it will disappear. In fact, it may become more important than ever in the face of set-at-a-time processing in SQL.

The SWU is the design practice of achieving high levels of performance by limiting the amount of work accomplished by each transaction. As a result, the on-line work load consists of numerous small transactions.

The SWU was first seen in PARS — the early airline reservation system environment. In PARS, airline clerks executed many small transactions to book a trip for a customer; they still do today. The SWU next appeared courtesy of McDonnell Douglas Automation in the mid-1970s.

Ah-ha

As McDonnell Douglas moved from IBM IMS/DB to IMS/DC, it soon discovered that the secret to better on-line performance was at the application design level and that high performance was achieved by creating many small on-line transactions, rather than a few large on-line transactions.

Most recently, the SWU has surfaced in the TP1 benchmarks that uniformly achieve high levels of performance. One of the traits of the transactions run under TP1 is that each accomplishes only a small amount of work.

The manifestation of the SWU in TP1 is probably more a function of the specification of the work to be done by the transaction than it is a conscious decision of the designer to implement the SWU. Nevertheless, the TP1 work load is a well-implemented manifestation of the SWU.

The profile of a work load built under the SWU is a multitude of small transactions. Work loads based on something other than the SWU contain a variety of transactions, some of which consume many resources and some of which consume few. Inevitably, the work load that contains transactions of mixed size exhibits poor performance. The work load that contains small, homogeneous transactions exhibits good performance.

Sizing it up

What makes a transaction large or small? The size of a transaction is determined by the resources it consumes. The more resources that transaction consumes, the larger it is.

There are — in a relational SQL environment — two re-

Continued on page 32

Firms use Saavi for human resources

BY ROBERT MORAN
CW STAFF

The larger an organization is, the more people work for it: hence, the more complex its human resource requirements are and the more likely that its computers will be taxed with numerous and sometimes redundant files that must be maintained, accessed and updated.

Two early users of Saavi, a human resources management package introduced four months ago, reportedly have used the system to streamline their human resources operations.

CBS, Inc.'s Record Group in New York and The Stanley Works in New Britain, Conn., now run their operations with Saavi, introduced by Information Science, Inc. in Montvale, N.J.

The software, targeted at large IBM and compatible mainframe shops, combines payroll, personnel, benefits, flexible compensation and pension administration in a centralized repository. The repository allows users to access discrete databases without having to know where information resides and without having to log on and off the different databases.

Recording Saavi

Art DeMaio, associate director of payroll processing at CBS Records, has been using Saavi since last month. His system consists of eight databases, which reside on an IBM 3090 mainframe at Martin Marietta Corp. in Orlando, Fla., while the company awaits the completion of its own data center.

CBS' Records Group also has three remote plants that access the same data center via personal computers equipped with Digital Communications Associates, Inc. Irma boards. Unlike users at CBS' Records Group headquarters, the plants are restricted by internal security to specific fields on their own employees, DeMaio said. In the future, the company intends to install Saavi/Link, a feature that permits the downloading and uploading of information between mainframes and PCs.

According to DeMaio, Saavi allows CBS' Records Group to maintain all the activity of a given pay cycle on-line. By linking the databases with Saavi, he said, "We can enter the system by Social Security number and the pay period of interest, and the system itself performs the links."

Without the software, CBS' Records Group would have to create and format external files as it ran payroll, send the files to

Continued on page 32

Data View

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Unix has made the greatest penetration in the multiuser PC environment

Type of computer	*Unix machines as a percent of installed computers*
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Midrange computers	8.1%
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Single-user PCs	0.5%
All computers (excluding single-user PCs)	23.4%

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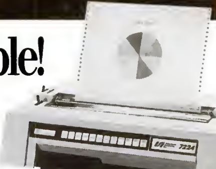

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SOFT NOTES

M&D acquires the Lawson Group

McCormack & Dodge Corp. (M&D), a company of The Dun & Bradstreet Corp., recently acquired the Lawson Group in Tampa, Fla., which is a manufacturer of personal computer-based human resources application software.

M&D, based in Natick, Mass., said it plans to create interfaces between its own IBM mainframe-based human resources packages and the Lawson software.

Unisoft Corp. in Emeryville, Calif., said it is offering an X/Open verification testing service to computer manufacturers.

The Unisoft service determines whether a system conforms to X/Open Consortium Ltd.'s X/Open common application environment. Should the equipment pass the test, the vendor reportedly would be entitled to display an X/Open branding logo.

Unisoft also announced the availability of Global Language Support (GLS), which reportedly enables users to interact with Unix applications or systems software in their native language.

GLS is based on **Hewlett-Packard Co.'s** Native Language Support.

Relational Technology, Inc. in Alameda, Calif., signed an agreement with **HP** under which Relational Technology's Ingres relational database management system will be offered under HP's Loaner Program.

Relational Technology was also named a National Account by HP, and Ingres will be supported by HP's sales and marketing staff.

Under the Loaner Program, prospective customers who run AT&T's Unix operating system may receive HP 9000 Series 800 Precision Architecture Systems for evaluation.

They may also receive Relational Technology's Ingres for evaluation.

Hamilton

CONTINUED FROM PAGE 25

spoke with seemed to take the Wang bashing in stride. Of course, these were folks who had just completed successful installations of the new VS10000, so they were feeling good in general and good about Wang in particular. But they did not express concerns over the long-term viability of the firm. Instead, they talked about how impressed they were with Wang's ability to get a smooth-running system delivered to them. The VS10000, it seems, gave them a new lease on their lives with Wang.

So analysts can dismiss Wang at the high end as an IBM challenger. In a system-to-system comparison, a mainframe shop will likely be hard-pressed to come up with a reason to go with Wang instead of IBM. The truth is, Wang did look a bit silly when it came out with results from an out-of-date benchmark to show that its VS10000 could best a 3090.

But within the Wang world, there are customers who go about their business and get their jobs done, regardless of how silly we say Wang looks to the market at large. These are people who made a commitment to a vendor years ago and plan to make the best of it.

Robert Evans, vice-president of information systems at El Paso Natural Gas Co. in El Paso, Texas, expressed his commitment to Wang this way: "We've got 12 to 13 million lines of VS code. We didn't look around" when it came time to upgrade.

Instead, Evans and other users worked on Wang to get the upgrade they needed. So far, the vendor has come through for them with flying colors.

Evans said his initial testing of the system's CPU showed results slightly better than Wang's own results. He said he is pleased enough with the VS10000 to have ordered 12 more, which will be installed over the next several months.

Another user acknowledged that there have been difficult times with Wang in the past, but he said he sees a promising future ahead. David Breizy, MIS director at Admiral Cruise, Inc. in Miami, said he recalls the introduction of the problem-ridden VS300 (since renamed the VS7310) and described it as a "nightmare."

Hamilton is *Computerworld's* senior editor, systems.

Ocean Spray

CONTINUED FROM PAGE 25

commissioned by Ocean Spray, Modestino worked with the architects in custom-designing the data center. Nuances that had become irritants at the old site could be suddenly eliminated. The raised floor was increased from 12 to 18 inches, for example, to give his staff more room to work, and security for the operations center was tightened.

Because the move was to take place during the three-day weekend, the Ocean Spray MIS staff had a one-day buffer period. But the move still needed to be exact. Equipment making the trek included an IBM 3081K mainframe, two IBM 9370 minicomputers, a Wang VS100 minicomputer, an array of direct-access storage devices, more than 30 printers, an IBM Rolm Systems CBX setup and 3,800 tape cartridges.

Battle plan in place

A battle plan that seemed to rival the Allied invasion of Europe was first drawn up, and days were sliced into one-hour segments and assigned a job. Just to be on the safe side, Modestino also logged in a precautionary On-Alert with Comdisco Disaster Recovery Services, Inc.

The Rolm system was the first to go because "the network was our most critical installation" Modestino said. On Friday at noon, the system was pulled out, loaded onto trucks and shipped off. The 9370s finished their backups and were the next to go, followed by the 3081. By 2:30 p.m. on Friday, MIS workers had begun reinstalling the IBM Rolm network, and by 5:30 p.m., the 9370s were being shoved into place.

Perhaps the most nerve-fraying moment came during the moving of the 3081K. A climate-controlled van was required for transport, but when the truck backed up to Ocean Spray's loading dock in Plymouth, the differing heights between the back of the truck and the loading dock made pushing the machine up a ramp impossible.

So the moving crew took another truck with a movable platform, loaded the CPU onto that and drove it across a parking lot where it was placed in the climate-controlled van. Modestino was at the new site at the time. "All I can say is thank god I didn't see it," he said.

The move also gave Modestino and crew a chance to do a little housecleaning. The chores handled on the VS100 were lightened, making way for its eventual replacement. Where once it had been used for electronic mail and word procesing, it now handles human resources and a consumer affairs tracking system.

By 9 a.m. Sunday, the move was complete and the system was up and running. The rest of the day was used for checking and rechecking installations and ironing out the wrinkles.

Unanticipated problems were few. A halon extinquisher briefly switched on in the old facility when the movers began kicking up dust. But perhaps Modestino's greatest frustration was not even computer related: When the company workers returned on Tuesday, more than 100 persons suddenly and randomly decided to switch offices, creating a file- and print-sharing nightmare.

On January 26, 1988, IBM announced new hardware and software advancements for information networks, including the IBM 3745 high-speed communication controller.

The 3745 offers significant performance improvements by providing high-speed communications capabilities and improved availability with two central control units.

And, the 3745 now gives customers greater connectivity, attaching to as many as 16 separate System/370™ computers and sending information faster, for less money.

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Work units

FROM PAGE 29

sources of paramount importance: the I/O consumed by the transaction and the data locked by the transaction.

The I/O consumed by the transaction refers to both the physical and virtual I/O consumed. The data locking of interest to the designer is relative to the amount of data locked, the length of time the data is locked and the level of control at which it is locked. The less data locked for the shortest amount of time, the smaller a transaction is.

SQL — whether under IBM's DB2, Oracle's Oracle or another database management system — presents several challenges to the designer who is serious about performance.

Data is accessed one set at a time, which makes it difficult to control the amount of data accessed. When the amount of data cannot be controlled, some transactions consume too much I/O. The selection criteria must be set carefully to ensure that sets that contain a large amount of data are not accessed.

Data is accessed by means of an index under most DBMSs that run SQL. Adding the overhead of index I/O onto regular I/O needed to access data increases total overhead.

Underlying data locking is managed by the system. When the programmer has no direct control over how it occurs, there is less opportunity for achieving high performance levels.

While the obstacles to achieving a reasonable SWU are real and formidable in SQL, they can be addressed by use of several design techniques. These techniques include the following:

- Never retrieve a set of data without knowing how many rows are to be returned. This design practice is nonnegotiable and is at the heart of the SWU in SQL. Retrieving a set of data of indeterminate rows opens the way to using too much I/O. The number of rows must be known before the transaction goes into execution.
- Satisfy as much processing as possible in an index or in a sparse index. Index and sparse index data is as tightly packed as data ever is in a relational environment. When a request for data can be satisfied in an index or a sparse index, the processing is as efficient as it is ever going to be.

WHILE THE obstacles to achieving a reasonable SWU are real and formidable in SQL, they can be addressed by use of several design techniques.

- Logically normalize data but physically denormalize it. When data is physically denormalized, it is possible to satisfy an SQL call using much less physical I/O than would otherwise be necessary.
- Break the function that is to be accomplished into small packages and create a separate transaction for each. The TP1 work load is as good an example as there is of this design technique.
- Move large transactions off into nonpeak processing hours such as 2 a.m. to 4 a.m. Get the truly large transactions and programs out of harm's way to where they will not cause their own bottleneck.
- Do all data definition or data description language processing during off-peak hours. Index creation, database loads, reorganization, restructuring of data and so forth should be done in the predawn hours or on weekends.
- If a transaction is large and must be run during peak periods, then iterate the transaction. Suppose a transaction is to access "n" rows, where "n" is a large number. The first execution of the transaction accesses rows one through 50. The next iteration of the transaction accesses rows 51 through 100. The next iteration accesses rows 101 through 150 and so on. A large transaction is thus broken into a series of smaller ones.
- Do not use VIEWs that span more than one table. Depending on the VIEW, much I/O can be consumed by merging of data.
- Do not employ referential integrity except for the simplest relationships involving very small sets of data.

The above design suggestions do not say anything about exactly how many I/Os or how much data can be locked by a transaction. Indeed, the actual quantity that can be consumed is subject to several factors: the size of the machine running the job, the desired response time, the total number of transactions being run, the maximum transaction arrival rate and the type of work being done.

The higher the levels of response that one desires, the more severe the parameters must be. The lower the levels of desired response, the more relaxed the parameters can be.

Encore

FROM PAGE 25

the substantial performance gain that the XPC represents over Encore's previous APC processor, which offered fewer than 50 MIPS. This increase resulted from advances in National Semiconductor's chips and Encore's modifications to its on-board cache architecture, said Vice-President of Hardware Development John Bartlett.

Encore officials singled out Digital Equipment Corp.'s 2-week-old VAX 6300 series. A high-end 6360 offers 22 MIPS for $751,900 while a Multimax 510 series can offer 17 MIPS performance for $159,000.

A fully configured 10-processor-board 520 can offer 170 MIPS for less than $900,000, Encore officials said.

The primary difference between the models is that the 510 offers an 11-slot backplane while the 520 offers a 20-slot backplane, and the 510 uses 5½-in. disk drives while the 520 employs 8-in. disk drives, said Director of Product Marketing Ron Cohen.

The Multimax 500 family with a 17-MIPS processor card running at 30 MHz is scheduled to be available in July. Prices will start at $159,000 for a 510 with a single processor card, 32M bytes of memory and 600M bytes of formatted disk.

Add-on XPC cards will be available at $59,000 each. A 14-MIPS card running at 25 MHz is available immediately. An upgrade program for the Multimax 300 family is also currently available.

Saavi

FROM PAGE 29

another database and log on and off of the payroll database to monitor the information, DeMaio said. With Saavi, the record company can cancel processed checks and readjust all entries within the system in one transaction.

James Meserve, manager of accounting services at The Stanley Works, has the corporation's personnel database running on an IBM 4381 and is currently installing the payroll database.

In the past, the company had separate payroll and personnel databases, with numerous programs written to access information on each. With Saavi, Meserve said, the company only has one database from which it extracts data on its 30,000 present and former employees.

Although generally pleased with Saavi, both DeMaio and Meserve fault Saavi's Generalized Retrieval System (GRS), an extract language used with the product. "GRS is slow because of the incredible security that is offered down to the field level," Meserve said. Since the company will decentralize this year, Meserve said Information Science must fix the problem before distributed sites input to the mainframe.

The software complies with IBM's Systems Application Architecture and costs between $100,000 and $412,000, using the same tiered pricing schedule as IBM. The price includes Saavi/Plus, a set of services that range from project management to implementation support.

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Distributed

CONTINUED FROM PAGE 25

dors such as IBM, Digital Equipment Corp. and Cincom Systems, Inc. are talking about what such a DBMS would look like.

In their scenarios, multiple data sites will have to contend with synchronizing updates to the database. Managers will have to troubleshoot problems at five mainframe sites, instead of at one or two.

All the familiar MIS problems will have grown geometrically, said Robert Tasker, vice-president of International Data Corp.'s (IDC) Software Research Group in Framingham, Mass. "The real question is whether or not business will be willing to pay the price of having distributed processing," Tasker said. "The big banks, the exchanges and the bond traders are going to go for it no matter what, but the run-of-the-mill DP shop will have trouble justifying the cost."

The costs may indeed be steep. Tasker believes that IBM, which plans many advanced distributed DB2 features for the 1990s, will require state-of-the-art systems for the task [CW, Feb. 6]. "DB2 and OS/2 and MVS/ESA, taken together, lead you to bigger hardware sales for more mainframes, disk drives and peripherals," Tasker said. "You'll have to be on the latest release of hardware and software to make it all happen."

Chris J. Date, executive vice-president of Codd and Date Consulting Group, sees even more obstacles to distributed DBMSs. Among them are concerns about security and the bandwidth and intelligence of the network.

"Fragments of data objects may be replicated many times and stored in multiple places," Date told the DB/Expo audience. "Users and user programs should not have to know about the physical location of data. The DBMS optimizer should know where all the data is stored."

Mixed-vendor networks are even further off, predicted Barry Rubinson, manager of product architecture at Digital Equipment Corp. "What the customer wants is the ability to interoperate between different vendors, to move software from one machine to another," Rubinson said at DB/Expo. "But all the bits coming down the wire have to work within the overall security management plan, or the customer will be hurt."

That means, he explained, that the problems of creating a distributed DBMS will be solved for homogeneous networks long before they are solved for mixed-vendor networks.

A final area of concern is matching the end user's need for transparency and simplicity with the MIS manager's need for data integrity and security. Transparency implies that many queries to a central database will remain hidden from the end user who is working with an IBM Personal System/2, for example.

"We are building an invisible infrastructure to enhance the effectiveness of dispersed work groups," said Jnan Dash, manager of IBM's Data Systems Strategy in the Santa Teresa, Calif., lab, which produces DB2.

Hiding the differences

To that end, Dash added, "We are working to hide the differences between the PC and mainframe modes." But the full expression of IBM's solution to the distributed DBMS may be at least two to five years away, he indicated.

"IBM is driving toward solving the technical problems, but the fact is we still need more intelligence in the network and more bandwidth to make distributed databases work," IDC's Tasker said.

Issues involving record-locking, file-locking and synchronization still threaten to block the way to truly distributed DBMSs, at least for the immediate future.

"Connecting Boston to Chicago to San Francisco without having the network disrupted by a backhoe on a Kansas farm is one problem," Tasker explained. "Tying in Munich, Tokyo and Sydney, Australia as well — and having just one image of that distributed database — is a real-life problem that hasn't been solved yet."

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Cortese

CONTINUED FROM PAGE 29

The media blitz was just another example of the increasing trend of holding press conferences to announce nothing at all, the theory being that those attending will be so carried away by the dramatics that they will think something must have been announced.

There was lots of rhetoric: AT&T is committed to working with Unix International, which is committed to working with X/Open. But working on what? Unix International restated its commitment to Unix System V (although not to AT&T's Open Look) and reaffirmed its support of standards such as X/Open's Common Application Environment.

One document details how the group will be organized and the procedures it will adhere to. Following in the footsteps of the firm it is to advise, Unix International is a study in bureaucracy.

A number of groups will focus on particular business or technical issues such as licensing and transaction processing. These groups are set up by, and fall under the jurisdiction of, a steering committee whose purpose is to set product direction for Unix System V. The steering committee, in turn, is subject to review from an executive committee that acts as the executive management group. This committee is responsible to the board of directors, which sets overall organizational direction. Throw in the technical advisory board and a few possible special interest groups, and the whole operation is bound immobile in red tape.

The procedures laid out in fine detail were just as complex, leading one to believe that the administrative staff will have to be at least the size of the Unix System V development team to keep up with all the paperwork. Given this structure and the fact that permanent staff still must be hired, Unix International's biggest challenge will be accomplishing its objectives in a reasonable time frame.

Although the principles on which Unix International is founded are valid, it is late in coming. If Unix International can overcome its self-imposed constraints, it might be a step forward for the industry, albeit one that should have been taken two years ago.

If such an organization were then in place, the Unix market might have been spared the uncertainty and turmoil to which it has been subjected.

Cortese is a *Computerworld* senior writer.

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NEW PRODUCTS — SYSTEMS

Data storage

An external 2.3G-byte tape-backup device has been announced by **Tense Lectronix Corp.**

The **TLC Legacy 2000** reportedly has an embedded small computer systems interface and uses helical scan technology.

The product can be used as a backup, archival or data distribution unit for IBM, Digital Equipment Corp. and Apple Computer, Inc. systems, according to the vendor.

Price for TLC Legacy 2000 is $5,999.

Tense Lectronix, Unit 20, 431 Alden Road, Markham, Ont., Canada L3R 3L4. 416-673-9333.

Memorex Telex Corp. has announced a stacking feature for its 5480 product line.

Designed to reduce floor space requirements and increase operator productivity, the product is said to provide an architecture for attaching cartridge units together, one on top of the other.

The unit is offered in two configurations: The **SP2-4** includes two 5481 controllers and four 5480 drive units and costs $14,000; the **SP2-8** accommodates two full strings, or two controllers with eight drives, and is priced at $20,000.

An upgrade from an SP2-4 to an SP2-8 costs $10,000.

Memorex Telex, 4343 S. 118th E. Ave., Tulsa, Okla. 74146. 918-624-4100.

National Advanced Systems has announced **4.5M byte/sec. transfer capability** for its 7480 cartridge tape subsystem. A **high-speed rewind** feature to improve tape throughput was also announced.

According to the vendor, the 7480 subsystem with 4.5M byte/sec. data transfer rates will offer as much as 50% improvement in data transfer rates for customers who are not able to utilize the company's currently available 6M byte/sec. capability.

The 4.5M byte/sec. support controller upgrade is priced at $4,000. Channel upgrades cost $1,500 each.

The optional rewind feature will reportedly reduce rewind time from 48 to 32 seconds per cartridge.

Scheduled for delivery in April, the option has a price tag of $2,000, the vendor said.

NAS, P.O. Box 54996, Santa Clara, Calif. 95054. 408-970-1000.

A series of VME/VSB dual-ported memory boards have been announced by **Clearpoint Research Corp.**

The **VSBram** line of add-in workstation boards reportedly offers Extra-Bit, a proprietary, automatic bad-bit replacement function.

The products were designed to provide OEM and systems integrators flexibility in 2M-, 4M-, 8M- or 16M-byte memory options.

Pricing ranges from $1,890 to $11,050, depending on memory configuration.

Clearpoint, 99 South St., Hopkinton, Mass. 01748. 508-435-2000.

Storage Technology Corp. has announced a cartridge tape I/O handler developed specifically for Unisys Corp. 1100 and 2200 processors.

Called **Cartlib**, the handler is offered as a feature of the company's 4780 18-track tape subsystems for attachment to Unisys computers.

Operating release levels include the OS1100 39R7 and above. Cartlib is slated for availability this month with an initial license fee of $9,000.

Storagetek, 2270 S. 88th St., Louisville, Colo. 80028. 303-673-5151.

An 8mm tape subsystem that offers as much as 2.33G bytes of storage in a 5¼-in. form factor is now available from **Eakins Associates, Inc.**

According to the company, the **Minimax Model 1X** runs on a variety of vendor platforms, including Digital Equipment Corp. computers under VMS, Sun Microsystems, Inc. SunOS workstations, IBM Personal Computers running PC-DOS and Apple Computer, Inc. MacOS and A/UX-based machines.

The tape also supports the AT&T Unix System V operating system, according to the company.

The product is priced from $4,000 to $7,000, depending on configuration, the vendor said.

Eakins, 67 E. Evelyn Ave., Mountain View, Calif. 94041. 415-969-5109.

On April 19, 1988, IBM introduced an advanced version of its premier relational DATABASE 2 (DB2™), providing substantial performance improvements over the previous release.

IBM's new DB2 Version 2 offers significant new functions such as referential integrity, which allows customers to maintain data relationships without the need for complex programming.

Responding to customer requests, these changes increase database performance and programming productivity.

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On April 19, 1988, IBM announced extensive product implementations of its Enterprise Systems Architecture/370™ (ESA/370™) only two months after its introduction.

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CW

I/O devices

An industrial-grade, 27-in. color monitor for public information display systems was announced by **Electrohome Ltd.**

According to the vendor, the **ECM 2700** was designed specifically for public viewing of computer-generated information and is especially suited for airline arrival and departure data, stock exchange information and point-of-purchase displays.

The unit incorporates a universal power supply and offers 720- by 540-pixel resolution.

The ECM 2700 is priced at $1,635.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

A line of business-class serial matrix printers has been introduced by **Genicom Corp.**

The **3410X** series printers were designed for specific applications, the vendor said, including bar code, color and quiet printing. The series consists of five models, each capable of printing 120 char./sec. at 12 char./in. in letter-quality mode. All the units offer Digital Equipment Corp. emulation.

Pricing ranges from $2,010 to $2,600, depending on configuration.

Genicom, Genicom Drive, Waynesboro, Va. 22980. 800-443-6426.

A point-of-sale printer has been unveiled by **Ithaca Peripherals, Inc.**

The **PCOS Model 250** reportedly combines a 40-col. thermal receipt printer and an 80-col. invoice printer into a single package weighing 14 pounds.

The unit prints 160 char./sec. at invoice speed, or 3½ line/sec. at receipt speed, and is capable of handling four-part invoice forms, Ithaca said.

A standard Centronics Data Computer Corp. parallel port is provided, and RS-232C and RS-422 ports are available optionally.

The standard Model 250 costs $995.

Ithaca, 147 Main St., Groton, N.Y. 13073. 607-898-9970.

Genicom Corp. has expanded its library of **international character-set print bands** for use in the Model 4285 band line printer.

The alphanumeric and special-symbol bands are said to be available in 48, 64 and 96 characters and include English, German, Danish, Norwegian, Swedish, Finnish, Spanish and French languages. Combinations of these languages can also be purchased from Genicom.

The bands are priced at $450 each.

Genicom, Genicom Drive, Waynesboro, Va. 22980. 800-443-6426.

A thermal transfer video printer is now available from **Toyo Spectrum Corp.**

According to the company, the **TPG-4300** can output 300 dot/in. full-color images on A- or B-size paper or transparency film from any CRT monitor with up to 1,280- by 1,024-pixel resolution.

Maximum printing time for a maximum B-size image in full color is reportedly 180 seconds, and the unit can accommodate daisy-chained multiplexers to serve more than four channels, according to Toyo.

The TPG-4300 costs $13,600.

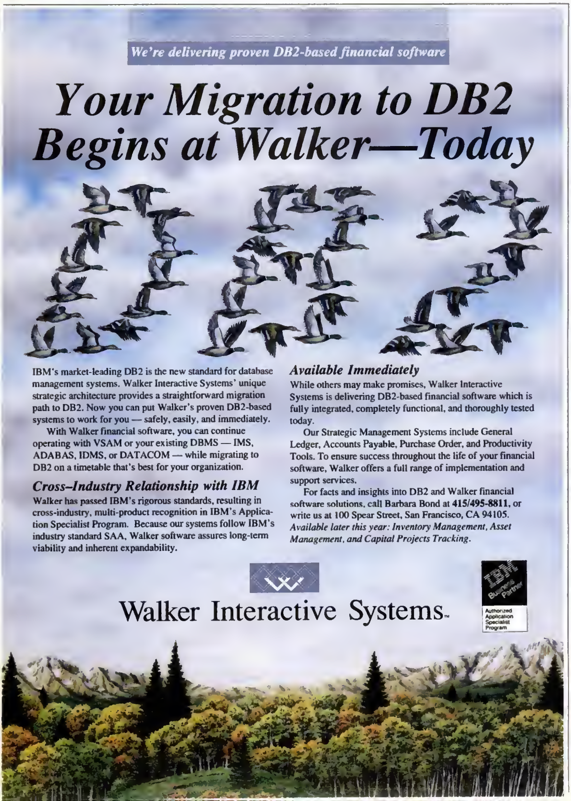
Toyo Spectrum, 2934 Corvin Drive, Santa Clara, Calif. 95051. 408-739-7913.

An assortment of 18-pin single-head dot matrix printers for IBM minicomputer and mainframe systems has been unveiled by **Seikosha America, Inc.**

The **SBP-10** series consists of the **SBP-10L** for bar code labeling applications, the **SBP-10TX**, a twin-axial model for use with IBM's System/36 and 38, and the **SBP-10CX**, a coaxial model that is reportedly compatible with IBM 3270 series mainframes. The company is also offering a 250 line/min printer, the **SBP-10AI**.

Suggested retail prices are $4,495 for the SBP-10AI and $5,995 for the SBP-10CX and TX unit. Pricing for the SBP-10L has not been determined.

Seikosha, 1111 Macarthur Blvd., Mahwah, N.J. 07430. 201-529-4655.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Decision Data Computer Corp. has expanded its family of 6700 matrix printers with the announcement of the **6760**.

According to the vendor, the unit was designed for use with the IBM System/34, 36, 38 and the entire Application System/400 line. It reportedly emulates the IBM 5224 printer and offers speeds of 800 line/min in draft mode and 165 line/min in near-letter-quality mode.

Decision Data's *printer*

The 6760 includes seven resident fonts and is priced at $9,500.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-956-5728.

A 26 page/min laser printer has been announced by **Advanced Technologies International, Inc.** (ATI).

The **LC-6026** offers Diablo 630, Hewlett-Packard Co. Laserjet, Tektronix, Inc. Model 4014 and other emulations, according to the vendor. The unit incorporates a proprietary controller and was designed for the high-volume text and graphics applications found in the finance, insurance and aerospace industries.

The LC-6026 costs $24,900.

ATI, 355 Sinclair-Frontage Road, Milpitas, Calif. 95035. 408-942-1780.

Radstone Technology Corp. has introduced a 32-channel Motorola, Inc. VMEbus parallel I/O board for process control and industrial automation applications.

Designated the **PIO-1**, the board can be accessed via 32-way connections on the front panel, which are organized as 32 channels of I/O and 32 channels of output with self-monitoring, the vendor said.

Multiple boards can reside on the same VMEbus backplane and can be configured to operate in trigger mode.

The product is priced at $890.

Radstone, 20 Craig Road, Montvale, N.J. 07645. 800-368-2738.

Diebold, Inc. has introduced a more flexible disk-based version of its MDS 1000 series automated teller machines, the company said.

The network-transparent **DX Option** is said to be retrofittable on existing, firmware-based MDS units and was designed to allow institutions to make screen changes at the branch level.

The option will also provide user-customizable graphics capabilities along with electronic journaling features for audit information, according to the company.

The DX Option is priced at $1,700 plus installation and is scheduled for delivery during the second and third quarters, the vendor said.

Diebold, 5995 Mayfair Road, North Canton, Ohio 44720. 216-497-4757.

QMS, Inc. has expanded its line of Adobe Systems, Inc. Postscript-compatible laser printers with the addition of the **QMS-PS 820**.

The printer reportedly offers Postscript controller functionality on a dual-bin Canon U.S.A., Inc. TX print engine and was designed for medium-volume, multiuser networked environments. The 8 page/min printer also features enhanced paper-handling capabilities.

The QMS-PS 820 is priced at $6,495.

QMS, 1 Magnum Pass, Mobile, Ala. 36618. 205-633-4300.

Power supplies

KW Control Systems, Inc. has announced the **UPS/400 Power Warning Interface** (PWI) for use with the company's True Power uninterruptible power supply (UPS) series.

The option reportedly communicates the following conditions to the IBM Application System/400 computer: UPS Bypass Active, showing that power is being provided through the bypass; UPS On, which indicates that power to the system is being supplied by the UPS whether or not utility power is available; a utility failure alert; and a low-battery warning designed to initiate a quick power-down sequence before batteries are depleted.

The UPS/400 PWI costs $500.

KW Control, R.D. No. 4, Box 194, S. Plank Road, Middletown, N.Y. 10940. 914-355-5000.

NEW PRODUCTS — SOFTWARE

System software

Accelr8 Technology Corp. has announced the **Libr8** series of Digital Equipment Corp. VMS runtime libraries and system service calls for the Unix operating environment.

According to the vendor, the libraries provide a simple migration path for users engaged in program redesign to move from VMS to the Unix operating system. Features reportedly include mailboxes and event flags, and the product can be purchased as an entire set or in functional subsets.

The complete package is priced from $3,100 to $9,000, depending on configuration, the company said.

Acceler8, Suite 108, 303 E. 17th Ave., Denver, Colo. 80203. 303-863-8088.

BGS Systems, Inc. has announced the **Best/1-VM XA** product family, an integrated system designed for VM/XA performance reporting.

The software series includes the following: **Capture/VM-XA**, for VM/XA SP performance reporting; **VM Applications Planner** for tracking and analyzing bimodal IBM CMS applications; and the **Best/1-VM** analytic modeling program, which is said to perform "what-if" analyses for VM/XA tuning and capacity planning.

The VM product packages range from $9,000 to $56,000, according to the vendor.

BGS, 128 Technology Center, Waltham, Mass. 02254. 617-891-0000.

Genrad, Inc. has announced the **GR MIDAS Plus** (Machinery Interactive Display and Analysis System).

The software, according to the vendor, was designed for online, continuous machinery health monitoring for power plant, petrochemical and chemical process applications.

The product provides data analysis and management tools, according to the vendor, and an relational database management system and sequencer controller are available as options.

GR MIDAS Plus runs on the company's Integrated Test and Analysis System hardware platform. The program is priced from $15,000.

Genrad, 300 Baker Ave., Concord, Mass. 01742. 617-369-4400.

VM Software, Inc. has announced **Lookout**, a facility in its VMmonitor product.

Lookout will reportedly facilitate continuous and unattended operations with a proactive approach to the individual monitoring needs of each site.

According to the vendor, the software was designed specifically for use in IBM VM environments. Features include disconnected virtual machine and device monitoring.

Lookout, according to the company, is scheduled for delivery in the first quarter of this year. VMmonitor is priced from $3,250, depending on CPU group.

VM Software, 1800 Alexander Bell Drive, Reston, Va. 22091. 703-264-8000.

On July 19, 1988, IBM introduced Disk Operating System (DOS) software, version 4.0, with an easy-to-use shell and expanded memory functions.

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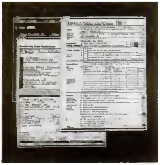

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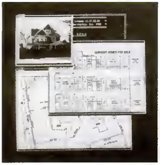

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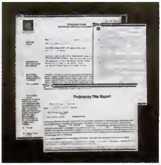

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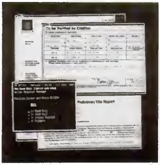

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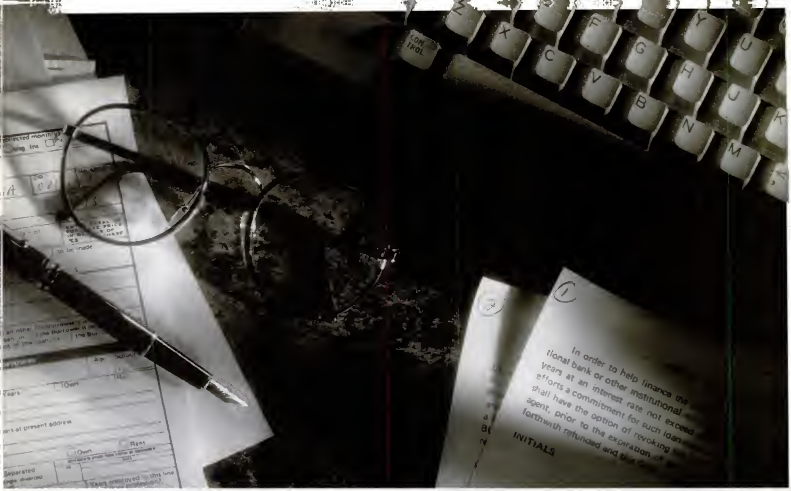
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Database management systems

BMC Software, Inc. has introduced a program for managing IBM DB2 catalog information.

The **DB2 Catalog Manager** reportedly requires little previous knowledge of DB2 or SQL and allows developers to search for and list any objects stored in a DB2 catalog. The product supports DB2 Versions 1.3 and 2.1, and perpetual license fees range from $7,500 to $25,625.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487. 800-841-2031.

Development tools

An expert system development and execution environment for IBM mainframes has been annouced by **Knowledge Based Technologies, Inc.**

According to the vendor, **Telus** incorporates a PL/1-based architecture and runs native under IBM's VM/CMS or as a task under IBM's MVS/CICS with support for CICS language command instructions. Features include an on-line relational database, a SQL-like query facility and a compiled, block-structured procedure language.

A single mainframe CPU license for Telus costs $150,000.

Knowledge Based Technologies, Suite 1000, 50 Main St., White Plains, N.Y. 10606. 914-682-2139.

Software Research, Inc. has announced its **M-Test** automatic test-driver system for software developers and system integrators.

Current releases of the product are supported on Sun Microsystems, Inc.'s Sun-4 Unix and IBM's Personal Computer AT-class Xenix-based platforms. The system was designed to provide automated test execution and analysis on multiple serial terminal lines. M-Test is priced from $24,000 for an eight-user system, to $35,000 for a 32-user version.

Software Research, 625 3rd St., San Francisco, Calif. 94107. 415-957-1441.

Languages

Unipress Software, Inc., a Unix software developer, has announced a compiler that reportedly converts C source code into Adobe Systems, Inc. Postscript code.

Called **C2PS**, the product was reportedly designed for use with Sun Microsystems, Inc.'s News window system and other environments that require the production of Postscript code.

According to the vendor, the compiler allows programmers to write entire applications in C. C2PS is priced at $2,995 for binary code and $14,995 for source code.

Unipress, 2025 Lincoln Way, Edison, N.J. 08817. 201-985-8000.

Introl Corp. has ported its entire line of **Introl-C Cross Compilers, Modula-2 Cross-Compilers, Macro Cross Assemblers** and **IDB Source Level Debuggers** to several previously unsupported platforms.

According to the vendor, the software now supports Sun Microsystems, Inc. Sun-3 workstations, Apollo Computer, Inc. workstations, Hewlett-Packard Co. HP 9000 Series 300 and Apple Computer, Inc. Macintosh computers.

The programs also reportedly run in Intel Corp. 80386-based systems.

Pricing for the software starts at $1,000, and all products include one year of software maintenance and update support.

Introl, 647 W. Virginia St., Milwaukee, Wis. 53204. 414-276-2937.

A C language programming environment for use on Sun Microsystems, Inc.'s Sun-4 workstations has been introduced by **Saber Software, Inc.**

Called **Saber-C**, the product is said to aid software development teams in prototyping, testing and debugging software in the C language.

According to the firm, the program is priced at $2,495 for the first license and $1,995 for two or more licenses.

Saber, 30 JFK Street, Cambridge, Mass. 02138. 617-876-7636.

Applications packages

Hewlett-Packard Co. has introduced a new version of **HP Deskmanager**, the company's electronic mail system.

The product has been enhanced to include support for Asian, Hebrew and Arabic languages, the vendor said, and now offers support for X.400 communications via HP Officeconnect to X.400.

The company has also announced an add-on product, **HP Deskmanager Intrinsics**, which was designed for application integration on an HP 3000 computer.

HP Deskmanager is priced from $5,300 to $34,750, depending on system and configuration requirements. HP Deskmanager Intrinsics is priced from $2,000 to $11,000.

HP, 3000 Hanover St., Palo Alto, Calif. 94304. 800-752-0900.

Autotrol Technology Corp. has announced **Facility Layout/Office**, or FL/O, the company's latest addition to its line of facilities design and management systems.

The product runs on Digital Equipment Corp., Sun Microsystems, Inc. or Apollo Computer, Inc. platforms and is said to be a complete system for producing layouts for offices, labs and light manufacturing areas. A relational database management system and two- and three-dimensional capabilities are included.

FL/O is priced from $13,800.

Autotrol, 12500 N. Washington St., Denver, Colo. 80233. 303-452-4919.

Access Technology, Inc. has announced that its **20/20** spreadsheet package is now available for Sun Microsystems, Inc.'s 386I workstations.

Release 2.2 also features new macro facilities, an improved user interface and a larger spreadsheet matrix size. The program also provides model password protection.

The 20/20 Release 2.2 package costs $600 per node. Multiple machine discounts and corporate licensing programs are also available.

Access Technology, 2 Natick Executive Park, Natick, Mass. 01760. 508-655-9191.

Utilities

Morss Software Development has announced Version **3.1** of its **Command File Scheduler**, designed to automate batch processing for Digital Equipment Corp's VAX/VMS-based computers.

The product generates the executable DCL command files and performs the proper submit commands necessary to provide automated scheduling. The system is priced from $6,000, with discounts for additional CPUs.

Morss Software, P.O. Box 1040, Bellevue, Wash. 98009. 800-635-1631.

A utility that allows IBM System/36 programmers to cancel specific jobs or groups of jobs via a single command has been introduced by **Amalgamated Software of North America, Inc.** (ASNA).

Called **Termin8**, the software can also monitor workstations for specific periods of inactivity. It is available for a one-time license fee of $500.

ASNA, Suite 300, 4041 MacArthur Blvd., Newport Beach, Calif. 92660. 714-752-7991.

GMD, Inc. has announced a product for IBM System/36 Manufacturing Accounting and Production Information Control System (MAPICS) customers.

The **Data Dictionary Link System** reportedly allows end users to access MAPICS data without calling support personnel. The program supplies file and field descriptions for all MAPICS files and costs $400.

GMD, 8601 Dunwoody Place, Atlanta, Ga. 30350. 404-587-0934.

On July 27, 1988, IBM researchers became the first to use X-ray lithography to make advanced computer chips. This will allow future IBM memory chips to hold more than 64 million bits of information.

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On September 13, 1988, IBM expanded its family of Personal System/2® (PS/2®) products with a new, more powerful entry-level model, the Model 30 286, bringing to 22 the number of PS/2 models available. It is up to twice as fast and offers up to 25 times more memory than the original Model 30.

The writers of these ads found it easier to write, edit, revise, store, retrieve and revise the ads again with the help of the IBM PS/2 Model 30 286.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Smudging Apple's shine

These are computers, not wine. Apple executives have made a bold disclosure. The Macintosh will have full multitasking somewhere around 1991 or 1992, just in time for our next presidential election.

And according to our best information, this wonderful multitasking will be relegated to Apple's newest and most expensive machines that happen to employ the Motorola 68030. This is because the 68030 comes with the nifty Paged Memory Management Unit built-in. This designation is a complicated way of describing a specialized chip that handles memory. The unit is also available on the more affordable Motorola 68020, but only as an option. So in three or four years, the wealthiest Apple customers will be able to multitask.

The one good thing about Apple's approach to multitasking is that its system will run today's applications. But by the time it arrives, as many people will care about "today's" applications as care about eight-track cartridges. They'll be obsolete.

Continued on page 52

Microsoft defines its strategy

Firm seeks to strengthen its already solid base in the applications market

ANALYSIS

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Microsoft Corp. is developing a family of applications for Apple Computer, Inc.'s Macintosh, Microsoft Windows and the OS/2 Presentation Manager, all anchored by a common graphical user interface. It is at the heart of a strategy that company officials outlined in recent interviews.

Microsoft, the company most known for its dominance of the personal computer systems software market, hopes to play a similar role in applications. With nearly 600 people in its applications group, it just may succeed.

Microsoft's Maples

Microsoft is currently the leading Macintosh software vendor, with Microsoft Word, Excel, Microsoft Works and Powerpoint all selling like glasses of water in the desert, according to the company.

On the personal computer side, Microsoft Word is the second best-selling word processing package, right behind Wordperfect from Wordperfect Corp. For the fiscal year ending this June, Microsoft is expected to sell $150 million worth of Microsoft Word, according to Jeff Raikes, general manager of Microsoft's office business unit. Overall, applications account for 45% to 50% of Microsoft revenue, said Mike Maples, vice-president of applications.

The turning point for Microsoft applications was the debut and subsequent success of Excel for the Macintosh, said Mike Slade, product manager of Microsoft Works, who worked on the Excel product. At the time of announcement, Excel was perceived as an underdog, with most observers believing that Lotus Development Corp.'s Jazz would rule the day. It was Jazz, however, that failed.

"It was the first time we had achieved dominant market share in any category on any brand of computer. To be charitable, they screwed up big-time. They did almost everything wrong," Slade said.

That experience convinced

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Inside

- Sizing up databases for the Mac. Page 43.
- Oracle's latest DBMS racks up points with users. Page 52.
- Sun 386I catches fancy of MS-DOS loyalists. Page 56.

DEC's service backing catches corporate eye

BY WILLIAM BRANDEL
CW STAFF

With a major computer vendor taking charge, MIS departments are responding favorably to the idea that Digital Equipment Corp. is offering Tandy Corp.-made personal computers to its customers. But whether company purchasing agents will let them pay the DEC price for a personal computer may turn out to be another story.

Of a handful of MIS directors at DEC sites, none would commit to buying a Tandy-made PC resold by DEC, mainly because of the price associated with the products. DEC's new PC line starts at $2,630 for the Intel Corp. 80286-based Decstation 210. The base price for the Intel 80386-based Decstation 320 is $4,960. In comparison, the Tandy equivalent of the Decstation 210, the Tandy 3000 NL, is listed at $1,699, while the 386-based Tandy 4000 LX costs $3,999.

But because of DEC's pres-

Continued on page 54

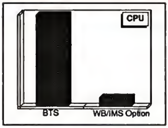
What's in a name?

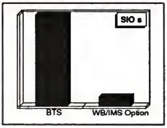
Only slight differences show up in a comparison of Tandy PCs marketed under the Tandy and DEC labels

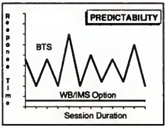
	Tandy 4000	DEC 320
Price	$3,999	$4,960
Intel 80386 microprocessor	Yes	Yes
20-MHz clock speed	Yes	Yes
Math coprocessor	Yes	Yes
System memory 2M to 16M bytes	Yes	Yes
14-in. monitor and IBM Video Graphics Array video support	Yes	Yes
Support for 3½-in. floppy disk and hard disk or disk cartridge	Yes	Yes
Support for small computer systems interface	Yes	Yes
6 IBM PC AT and 2 XT slots	Yes	Yes
Support	Retailer	DEC

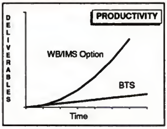
CW CHART: JOHN YORK

Technology Breakthrough: IMS DB/DC on a PC !









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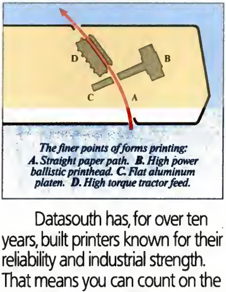
The DS 400 prints fast, too. Draft text at 400 cps, memo quality at 180 cps, and near letter quality at 120 cps.



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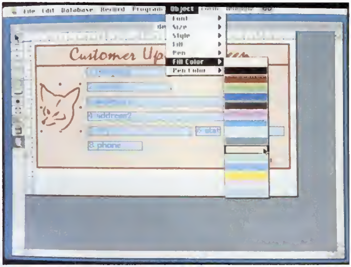
REVIEWS/NEW PRODUCTS

Evaluating a universe of databases for the Macintosh



Fox Software's *Foxbase Plus/Mac*

An important feature to look for in Apple Computer, Inc. Macintosh product development is the capability to create an application that takes full advantage of the Macintosh environment: the easy-to-use graphical interface, the intuitive menu bars and pop-up menus and the other little goodies that make life with a computer easier.

The databases featured in this comparison include Acius, Inc.'s Fourth Dimension, Ashton-Tate Corp.'s Dbase Mac, Odesta Corp.'s Double Helix II, Fox Software, Inc.'s Foxbase Plus/Mac, Nantucket Corp.'s McMax and Blyth Software, Inc.'s Omnis 3.3 Plus. All are capable of building fully relational applications with links between files, so that data can be related from one application to another. All of the products reviewed performed well, with no recurring system crashes or hangs. Their differences lie in speed, ease of learning and the degree to which they make use of the Macintosh interface.

While not all the products require a hard disk, it is difficult to imagine trying to use any of these programs for serious work without one. All vendors recommend use of the latest Apple System version, currently the System 6.0.2 package. This includes System 6.0.2, Finder 6.1, Multifinder 6.0.1 and Laser Prep and Laser Writer 5.2.

• Acius' Fourth Dimension
Fourth Dimension is not for the faint of heart: It is the power programming tool for the Macintosh. Much more than a database program, it is a complete development system with its own programming language.

One of Fourth Dimension's most powerful features is the use of subfiles. A subfile is a group of records, or subrecords, attached to a specific record within another file. The subfile method lets the programmer design some very elegant and easy-to-use applications.

The use of subfiles makes entering and viewing multiple files on one screen particularly easy. Reporting on the related files is also easily accomplished through the use of subforms and linked files. The use of canned search routines assists the programmer in setting up query dialogs; they also provide plenty of flexibility in creating queries.

Fourth Dimension's programming language is without question the most powerful of those reviewed here, offering features including external code from any high-level programming language such as Pascal or C, 68000 assembly language, or Apple Hypercard XCMD commands.

Where Fourth Dimension falls flat on its face is in the speed tests. The product is extremely slow at many tasks, particularly importing and exporting data. You will need an accelerated Macintosh SE or Mac II to really take advantage of the power of this program.

Fourth Dimension can boast the dubious honor of having the longest learning curve of any Macintosh database product; we estimate the average user will require about six months to get up to speed. But once you are up to speed, you will be able to create industrial-strength applications with the true look and feel of a custom Macintosh program.

Acius provides free support indefinitely, but the phone number provided is not toll-free. Special developer support programs are available.

Although priced at $695, Fourth Dimension carries the highest price tag of all the products reviewed but also offers more power. Fourth Dimension is one of three programs reviewed here that can operate in multiuser mode. You do not need to buy additional modules for multiuser setup. A four-pack of the runtime version costs $295.

• Ashton-Tate's Dbase Mac
Contrary to the implication in its name, Dbase Mac is not a Dbase clone for the Mac. Dbase Mac reads Dbase II, III, III Plus and IV data files — but not programs or indexes — and shares a number of programming features with Dbase. While Dbase Mac uses some commands that are similar to those of Dbase for DOS, the interface and programming language of the Mac product are very different.

Dbase Mac offers more choices than the other products we tested, but relational data entry is not as smooth in implementation as it is with Fourth Dimension or Double Helix. Although it is quite easy to set up relational data entry screens in which data can be entered into several files at once, it is best to experiment quite a bit before you start entering the whole year's data.

Dbase Mac executes its programs too slowly, taking inordinately long times to perform such basic tasks as opening a small file. Dbase Mac was the slowest in querying of all the programs we tested.

The programming language is a pleasure to use for personal or business applications. If you want to extend the provided language, you can use the Call function to implement procedures written in Pascal or C into Dbase Mac programs.

A Dbase Mac application is organized into projects, with each project consisting of a database structure window and some views. This makes the programmer's job more complicated, since a lot of work is involved in setting up different projects.

Ashton-Tate provides only 90 days of support; thereafter, you can subscribe to a variety of support options.

It is odd that Ashton-Tate, developers of the Dbase language, chose to create a Macintosh database that will not directly use Dbase programs. But, at $495, Dbase Mac has a certain charm that will appeal to people who do not need the sophistication of Fourth Dimension or Foxbase Plus/Mac.

• Blyth Software's Omnis 3.3 Plus
Omnis is the old-timer among Macintosh relational databases, having been around since 1984. Consequently, the product has a very large installed user base and a huge library of Omnis templates that can be purchased for a reasonable price.

The Express module was introduced a year ago. Express is a front-end development interface that assists the user in building a

Test results
Product comparisons of relational database management systems

	Fourth Dimension	Dbase Mac	Omnis 3.3 Plus	Foxbase Plus/Mac	McMax	Double Helix
Relationality tests:						
Relational data entry	Very good	Good	Good	Good	Poor	Excellent
Relational reporting	Very good	Good	Good	Good	Poor	Very good
Relational querying	Very good	Good	Satisfactory	Good	Satisfactory	Excellent
Programming language	Excellent	Good	Good	Good	Satisfactory	Good
Speed tests:						
Running programs	Satisfactory	Satisfactory	Good	Excellent	Very good	Good
Flat-file query (indexed record access)	Satisfactory	Poor	Satisfactory	Excellent	Excellent	Very good
Flat-file query (unindexed record access)	Unacceptable	Unacceptable	Satisfactory	Excellent	Excellent	Unacceptable
Setup functions	Poor	Poor	Satisfactory	Excellent	Good	Very good
Documentation	Good	Very good	Satisfactory	Poor	Unacceptable	Very good
Ease of learning	Satisfactory	Very good	Satisfactory	Good	Satisfactory	Very good
Ease of use	Very good	Very good	Good	Very good	Poor	Very good
Error handling	Very good	Satisfactory	Good	Satisfactory	Satisfactory	Very good
Support:						
Support policies	Satisfactory	Satisfactory	Satisfactory	Good	Poor	Satisfactory
Technical support	Good	Good	Good	Poor	Satisfactory	Poor
Value	Good	Good	Satisfactory	Very good	Satisfactory	Good

CW CHART: JOHN YORK

Continued on page 44

Mac databases

CONTINUED FROM PAGE 43

new application quickly, without the need to know the Omnis programming language. Express makes development much easier for the beginner. However, you cannot make modifications to your program in Express; you have to go into the regular Omnis program to do that.

Creating a relation or a relational report in Omnis is easy, although it is accomplished in a different manner than most of the other databases.

Version 3.3 introduced some interesting new features, most significant of which is Omnis SQL. This provides the capability to access databases on other computer systems that use SQL.

As with other programs that use a procedural language, Omnis lets you use the layout editor to create layouts and then review and modify the code. Sequences are attached to layouts; they are easily accessed for editing through a menu selection.

Omnis is rather hard to learn because of its limited implementation of the Macintosh interface and the complexity of the programming language. The product's training materials were not updated for Version 3.3, and some of the terminology used by Omnis will take a bit of getting used to.

Support is provided free of charge for 60 days; if you need it for longer, you will have to pay. The vendor offers a performance warranty, a technical support newsletter and support through two bulletin board services.

Priced at $795, including Express, Omnis is the most expensive product reviewed in this analysis. It is harder to learn and use than Double Helix, but its SQL and its access to a programming language make it more flexible. Omnis 3.3 Plus is available in a multiuser version that supports Apple's Appleshare and Dec's Tops (total operating system). Express can be purchased separately for $99.95.

• Fox Software's Foxbase Plus/Mac

The only newcomer to this field since last year's roundup is Foxbase Plus/Mac. Like its PC counterpart, Foxbase Plus, Foxbase Plus/Mac is completely compatible with Dbase III Plus programs and files. Unlike many products that are transported from the personal computer to the Mac, however, Foxbase Plus/Mac has been implemented with a complete Macintosh interface.

Thanks to its Mac interface, Foxbase Plus/Mac fared better in many of our categories than its DOS cousin. Setting up relations between files is far less complicated. Version 1.1 now boasts Foxform (a screen painter), Foxcode (a template compiler) and Foxgen (an application generator). Together, these modules constitute a complete front-end development environment. The Foxbase developer can use these tools to create some pretty sophisticated turnkey applications.

You can transport your Dbase programs and files over to a Macintosh, and Foxbase will run them flawlessly and with great speed. You will also have access to the thousands of applications that have already been written in Dbase for MS-DOS. Any existing Dbase program can be turned into a Macintosh application, complete with Mac interface tools such as check boxes, radio buttons and scrollable lists and fields. Graphics can be added, as can color (on a Mac II).

The experienced Dbase user can bypass the Mac interface if he feels more comfortable working directly with the code.

From the command window, which is analogous to Dbase's dot prompt, you can get right to the heart of the matter by digging into the Dbase-like code. Program tracing and debugging tools are provided and work well.

Foxbase still does not support some vital import functions; IBM's Display Information Facility, Sylk and WKS files cannot be imported.

Foxbase is fast. The only other Macintosh database that comes close in speed is McMax, which is quite a speed demon in its own right.

Fox Software offers free lifetime support. Registered users also receive a quarterly newsletter and can get additional support through the Compuserve Bulletin Board Services. Unfortunately, we found support hard to come by. It can take days to resolve a problem.

With a list price of $395, Foxbase Plus/Mac is one of the lowest priced products we reviewed. Considering the product's great speed, ease of use and unlimited technical support offered, this is the only product we consider a very good value. A multiuser version began shipping in December, with a list price of $595. Owners of the single-user version can upgrade for $200.

• Nantucket's McMax

McMax is very much like a Dbase III Plus running on a Macintosh. There is no Macintosh interface and front-end development system. Publisher Nantucket said this package is for developers who want to run existing DOS Dbase applications on the Macintosh and cannot justify rewriting the application in a Macintosh database. It is also for Macintosh users who want to run a Dbase application available only for DOS machines.

If you like the Macintosh interface, you will not like McMax. However, according to Nantucket, a new version featuring tools that allow developers to create applications with a more Mac-like interface is planned for release.

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The 8088-equivalent microprocessor has a 7.16 MHz clock speed (vs. 4.77 MHz for other PC-compatible portables). Standard equipment includes two 720K 3½" built-in disk drives and 768K RAM—ample memory to run today's powerful MS-DOS based programs.

The Tandy 1400 LT also includes a parallel printer adapter, RGBI color monitor output, a real-time clock and an RS-232C serial interface. You even get MS-DOS 3.2 and GW-BASIC.

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Because it is a Dbase clone, McMax suffers from all the same vices as its mentor. It may be worse off because MS-DOS users can use many third-party utilities, such as report generators and compilers, to help out. McMax works exactly like Dbase III Plus: Querying is a complicated and potentially confusing process that becomes easier as you become more skilled and competent in the programming language.

McMax's Assist mode is similar in function to Dbase's, making this program somewhat easier to use.

One strong point of McMax is its speed. A year ago, this factor alone might have made McMax worthy of consideration, but since the introduction of the even faster and far more feature-laden Foxbase Plus/Mac, McMax is left at the starting gate.

McMax's manuals are useful only to the experienced Dbase user. One saving grace is that if the only thing you are doing is running an existing Dbase application, you should not have to open the manuals.

Only 30 days of free technical support are provided. This is not enough for any program, especially one as hard to learn as this. Afterward, extended support is available for $99 a year; this includes unlimited calls and a newsletter. All users can gain support through the CompuServe Bulletin Board Service.

At $295, McMax is the lowest priced database we tested. The inclusion of a royalty-free runtime is noteworthy. The product will appeal only to a specific market — those who need an inexpensive way to run unaltered Dbase DOS code on the Macintosh.

• Odesta's Double Helix II

Double Helix II takes an entirely different approach to programming by using a completely graphical interface. Instead of writing lines of code, making menu choices or using an expression builder, you construct a picture of what you want to achieve by using predefined programming tiles, or icons representing actions and relationships. It is the point-and-click method taken to the limit: Just choose the action you want and drop in the specifics.

Other programs offer a pictorial image of your file structure; Double Helix does not require you to set up relationships between files until they are needed. You only need to make sure that a complementary field exists in both files and that the field to be linked (or looked up) is indexed.

Double Helix offers powerful and flexible capabilities that are a bit difficult to master. The new Posting feature makes it possible to set up data entry screens through which data can be entered into other relations. Relational reporting is accomplished by using lookup tiles and subforms.

Although Double Helix's idea of a programming language is different, it does provide the capability to create procedures that rival the languages provided by programs such as Dbase Mac.

To the programmer, however, Double Helix can be frustrating. It is very difficult to organize the icons that make up your program so that it is easy to trace and debug.

Odesta provides free technical support on a toll-free line for as long as you need it.

Double Helix costs $495. Any Double Helix application can quickly be turned into multiuser mode with the purchase of the multiuser pack for an additional $495. The pack consists of one host and three "guest" nodes. Additional nodes cost $150 each.

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BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIMSPLIT — May be used separately or with BIMSPOOL to print parts of an existing job to terminal printers at separate sites. NEW
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.
BIM-PADS — Automatically alters or deletes DOS POWER spooled job entries at preset intervals. NEW
BIM-ODIS — Comprehensive problem analysis and display of operational CICS system. **ODISTRAK** is an optional historical reporting feature to be used with BIM-ODIS to generate reports relating to system usage. **DOS** and **OS**. NEW
BIM-BUFF — Significantly increases the performance of VSAM under DOS by dynamically managing VSAM buffers. NEW
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input. **DOS** and **OS**.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. **DOS** and **OS**.
BIM-FMAP — CICS BMS on-line map generation and maintenance. **DOS** and **OS**.
BIMECHO — Copies one CRT's output to another or printer for problem determination and demonstration. **DOS** and **OS**.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer. **DOS** and **OS**.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMCNSOL — Multiple/Remote System Console function for CICS. Display-only or full input/display versions available.
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With the introduction of five new software products on September 20, 1988, IBM became one of the first U.S. manufacturers to incorporate into their machines systems network programs based on international standards.

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NEW PRODUCTS

Systems

Zaki Corp. has announced that **PC Shareplus** is now available to run in the IBM Personal System/2 Micro Channel Architecture environment.

The product line was designed to provide users with multiuser workstation capabilities without the use of local-area networks, the vendor said. The PC Shareplus product package is said to include three monographic workstations and a PC Shareplus/2 Interface adapter card and is priced from $3,495 to $4,495, depending on configuration.

Zaki, Maple Technology Park, 420 Maple St., Marlboro, Mass. 01752. 508-480-0201.

An access-management software system designed to provide three levels of personal computer security is now available from **Thumbscan, Inc.**

According to the company, **AMS-PC** provides biometric fingerprint reading, token key and password protection. Optional features include boot protection and a scramble/autoscramble function that encrypts and decrypts data files. The system is compatible with IBM Personal Computers, PC XTs and AT and compatibles and requires MS-DOS 2.1 or later.

AMS-PC is priced at $325 for an ID/password configuration. Access key and fingerprint reader options can be added for $100 and $1,195, respectively.

Thumbscan, 335 Eisenhower Lane S., Lombard, Ill. 60148. 312-932-8844.

Hyundai Electronics America has reportedly reduced prices on its entire line of personal computer products.

According to the vendor, the Hyundai Super-286c with a 1.2M-byte floppy disk drive will cost $1,195, reduced from $1,645. A single floppy drive system with a 30M-byte hard disk is priced at $1,745, and a 40M-byte version costs $1,945. Previous prices for these configurations were $2,295 and $2,545, respectively. Reduced pricing information is also available for the company's monitor, file server and local-area networking products.

Hyundai Electronics, 166 Baypointe Pkwy., San Jose, Calif. 95134. 408-473-9200.

Software applications packages

An enhanced version of **Protec**, a software security system for MS-DOS-based computers, is now available from **Sophco, Inc.**

Release 3.3 reportedly provides hard disks with boot protection by controlling access to the hard disks through a log-on password mechanism. Other features include audit trails on report violations and system usage as well as automatic user segregation of sensitive data files. Protec 3.3 costs $195.

Sophco, P.O. Box 7430, Boulder, Colo. 80306. 800-992-3001.

Lotus Development Corp. has announced the release of **Stock Chart**, an application designed for technical analysts, portfolio managers and securities analysts.

The product is a component of Lotus' CD/Investment package, which combines financial data with retrieval and analysis software in a compact disk format. Stock Chart reportedly allows users to generate presentation-quality stock price and volume charts and is bundled with the CD/Investment Daily Stock Price History subscription. The Lotus Graphwriter II automatic charting system and a minimum of 640K bytes of memory are required for operation. Subscription rates range from $7,500 to $20,000, depending on selection of databases.

Lotus, 55 Cambridge Pkwy., Cambridge, Mass. 02142. 617-577-8500.

Intex Solutions, Inc. has announced an add-in product for users of Lotus Development Corp.'s 1-2-3 requiring extensive mathmatical and statistical capabilities.

Stats is reported to be a library of 44 analytic functions, including linear regression, percentile calculation, kurtosis and standard deviation. Other functions calculate averages, variances and sums. The product costs $295 plus $5 for shipping and includes a 30-day money-back guarantee.

Intex, 161 Highland Ave., Needham, Mass. 02194. 617-449-6222.

Software of the Future, Inc. has revised its sales and marketing package for IBM Personal Computers, Personal System/2s and compatible systems.

Version 2.0 of Salemaker Plus reportedly includes pop-up windows and an interface to Hewlett-Packard Co.'s Laserjet and Toshiba America, Inc.'s 12 compatible printers.

The package also incorporates a word processor that can store up to 1,295 letter templates, the vendor said.

Salemaker Plus 2.0 requires 640K bytes of random-access memory and costs $695. A five-user local-area network version is available for $2,495.

Software of the Future, P.O. Box 531650, Grand Prairie, Texas 75053. 214-264-2626.

A pop-up word processor for users of Lotus Development Corp.'s 1-2-3 is now available from **Bi-Intelligence, Inc.**

Named the **Heavy Duty Word Processor**, the package is said to be a full-featured word processor with a 90,000-word spelling checker and cut-and-paste capabilites. The random-access memory-resident software runs on IBM Personal Computers and compatibles with 384K bytes of memory under DOS 2.0 or later. It is priced at $45, which includes unlimited technical support.

Bi-Intelligence, 210 E. 86th St., New York, N.Y. 10028. 800-451-0303.

Lifetree Software, Inc. has announced **Volkswriter 4 with Perfect Grammar**, a word-processing package designed specifically for managers, professionals and administrators.

The product reportedly corrects the writer's grammar as it is written and runs on IBM Personal Computers, Personal System/2s and compatibles with 640K bytes of random-access memory. It is priced at $199, and registered users of Volkswriter 3 may upgrade for $88.

Lifetree, 411 Pacific St., Monterey, Calif. 93940. 408-373-4718.

Versasoft Corp. has released **Version 5.0** of **Dbman V.**

The product was designed as an Ashton Tate Corp. Dbase III Plus "workalike" software and is available in both single-user and multiuser configurations. Dbman Version 5 is priced at $189.95 for PC-DOS single-user copies and $499.95 for a multiuser package that runs in either Novell, Inc.'s Netware or PCnet environments.

Versasoft, Suite 250, 4340 Almaden Expressway, San Jose, Calif. 95118. 408-723-9044.

Cadam, Inc. has announced a computer-aided design and manufacturing program developed specifically for Intel Corp. 80386-based machines.

According to the vendor, **Micro Cadam Plus** can access memory beyond the 640K bytes addressed by the personal computer's DOS operating system and thereby allows users to create larger models. The product requires 640K bytes of memory, 4M bytes of extended memory, a math coprocessor and a hard disk.

Micro Cadam Plus costs $3,995 and is scheduled to ship in the first quarter.

Cadam, 1935 N. Buena Vista St., Burbank, Calif. 91504. 818-841-9470.

A circulation management program designed for the desktop publishing industry has been announced by **Organization Technologies Group, Inc.**

Mailworks Plus Version 3.0 reportedly provides several list management techniques, including postal sorting, mailing labels, renewal notices and subscriber invoices. The program also offers financial and management control reports and requires 640K bytes of random-access memory and a hard disk.

The software runs on IBM Personal Computers XTs and ATs, Personal System/2s and compatibles and costs $1,595.

Organization Technologies, P.O. Box 15149, Portland, Me. 04103. 207-878-2077.

Good Software Corp. has released **Version 2.0** of its word processing package.

Celebrity Write includes an 80,000-word checker and corrector and a thesaurus, the vendor said. A print-spooling function and a mail-merge system are also provided. The program runs on IBM Personal Computers and compatibles and costs $129.95.

Good Software, Suite 500W, 13601 Preston Road, Dallas, Texas 75240. 714-239-6085.

Dow Jones Information Services, an operating group of Dow Jones & Co., Inc., has revised its technical analysis software.

According to the company, **Market Analyzer 2.0** collects and charts as much as 15 years of daily, weekly and monthly historical data for more than

120,000 stocks, mutual funds, debt issues and market indexes. The material is reportedly drawn from several Dow Jones News and Retrieval databases.

Market Analyzer 2.0 costs $349 and runs on IBM Personal Computers, Personal System/2s and compatible systems.

Dow Jones, P.O. Box 300, Princeton, N.J. 08543. 609-520-4642.

A spelling checker for Microsoft Corp.'s Works package is available from **Lundeen & Associates.**

Works Plus Spell 2.0 can check more than one page per minute, and the latest release offers a "smart spelling" feature that remembers which text has been checked before, the company said.

Current users can upgrade to Version 2.0 for $15.

Lundeen, Suite 107, 10000 Atlantic Ave., Alameda, Calif. 94501. 415-769-7701.

Software utilities

Royall Enterprises has announced a spreadsheet enhancement package for Borland International's Quattro users.

According to the company, **Tactecs** will generate charts and tables directly within a spreadsheet by using the IBM Extended Character Set. The software requires 3K bytes of memory and will reportedly integrate with any Quattro menu structure. It is priced at $49.95.

Royall, P.O. Box 1134, Bloomfield Hills, Mich. 48303. 313-641-8245.

A directory label printing program for MS-DOS systems has been introduced by **ETS Center.**

Called **Dirlabel,** the software allows users to preview or print labels of any directory or subdirectory from either diskette or hard disk, the company said. The program will print up to 40 file names per label and may be loaded as a memory-resident program if desired. It is priced at $39.

ETS Center, 35026-A S. Turtle, Willoughby, Ohio 44094. 216-946-8479.

Effective Data Solutions has announced a programmer's tool kit designed to streamline address processing in IBM Personal Computer and compatible system applications.

Zipwhere is for programs written in C and reportedly contains a database of over 49,000 records. These include ZIP codes and associated city names, states, counties, time zones, telephone area codes and mileage grid coordinates.

The software requires DOS 2.1 or higher and is priced at $139.

Effective Data Solutions, 28225 Agoura Road, Agoura Hills, Calif. 91301. 800-777-8818.

A combination data dictionary and documentation generator that runs on IBM Personal Computers and compatibles has been introduced by **MIS Software Development, Inc.**

Called **3Dgen,** the stand-alone product can be used to define and interrelate data elements, codes, tables, input forms and other files, the vendor said. Features include menu-driven screens and on-line help, and the program requires MS-DOS or PC-DOS 3.1 or higher, 640K bytes of memory and a hard disk.

3Dgen costs $295.

MIS Software, 1349 Cross Creek Way, Tallahassee, Fla. 32301. 904-878-3096.

OS/2 software

Graphic Software Systems has announced the **GSS-GKS Kernal System for OS/2,** designed to fully implement the ANSI and ISO standard Graphic Kernal System (GKS) for device-independent graphics applications.

The software reportedly runs on OS/2-based or Intel Corp. 80286- or 80386-based systems. The product supports input, display and output devices from IBM, Hewlett-Packard Co., Microsoft Corp. and other companies and costs $595.

GSS, P.O. Box 4900, 9590 S.W. Gemini Drive, Beaverton, Ore. 97005. 503-641-2200.

Micrografx, Inc. has upgraded its **Designer** graphics software package.

According to the vendor, **Version 2.0** has been enhanced to offer compatibility with OS/2 Presentation Manager. The latest release also provides automatic gradient fills, autotrace capabilities and curve-editing features. The software requires a minimum of 640K bytes memory and a hard disk.

Designer 2.0 is priced at $695; registered users can upgrade for $99.

Micrografx, 1303 Arapaho, Richardson, Texas 75081. 800-272-3792.

Imaging Technology, Inc. of Woburn, Mass., and **Media Cybernetics** of Silver Spring, Md., have jointly announced the availability of **Image-Pro** for Imaging Technology's IBM Personal System/2-compatible Series 151 subsystem.

Image-Pro II is said to be an interactive, menu-driven software package developed by Media Cybernetics for general-purpose and high-level image processing. The latest release, designed to offer Micro Channel-based imaging software support, is priced at $1,995. A mouse interface is required.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

Macintosh products

Truevision, Inc. has announced the recent release of an add-on memory module for its Nuvista series of videographics cards.

The **NuVMX Memory Expansion Module** reportedly adds 2M, 4M, or 8M bytes of dynamic random-access memory to any model in the Nuvista series.

The product is directly accessible to the Nuvista card's graphics processor and to the Apple Computer, Inc. Macintosh II host, according to the vendor.

The NuVMX is priced from $1,500 to $4,500, depending on memory configuration.

Truevision, 7351 Shadeland Station, Indianapolis, Ind. 46256. 800-858-8783.

A geographic analysis and mapping program for the Apple Computer, Inc. Macintosh machine is now available from **Micromaps Software, Inc.**

Quickmap reportedly provides a method for analyzing and mapping data on 50 states, and it allows users to build customized analysis programs for specific regions of interest. The product requires Hypercard and is priced at $99.

Micromaps, P.O. Box 757, Lambertville, N.J. 08530. 609-397-1611.

GDT Softworks, Inc. has released **Jetlink Express,** the company's printer driver for the the Apple Computer, Inc. Macintosh.

Created for the Hewlett-Packard Co. Laserjet series and compatible devices, the product is said to use outline-font technology and employs features common to Adobe Systems, Inc. Postscript-compatible laser printers at resolutions up to 300 dot/in.

The driver comes with cable and 13 outline fonts and is priced at $149. Shipments are scheduled to begin this month, according to the vendor.

GDT Softworks, P.O. Box 1865, Point Roberts, Wash. 98281. 604-291-9121.

A **translator tool kit** for the Apple Computer, Inc. Apple II, II Plus, IIC, and IIE is now available from **Do It Right Software.**

The package was reportedly developed for experienced programmers and contains translator programs for converting Apple 65C02 machine code programs into equivalent IBM 8088 machine code programs.

The product is formatted on a 5¼-inch floppy disk and costs $74.95.

Do It Right, P.O. Box 1097, Yorba Linda, Calif. 92686. 714-777-0198.

Summagraphics Corp. has announced an **Apple Desktop Bus (ADB)** kit developed to make its large format digitizer, Macgrid II, compatible with Apple Computer, Inc.'s Macintosh II and SE computers.

Designed for computer-aided design and mapping applications, the interface kit is said to include a utilities driver, the ADB box, cable and a manual. It is priced at $189.50, with deliveries scheduled for March.

Summagraphics, 60 Silvermine Road, Seymour, Conn. 06483. 203-881-2000.

A family of coprocessor cards designed to provide connection between Apple Computer, Inc. Macintosh computers and systems running MS-DOS has been announced by **Perfectek Corp.**

The series includes: **Mac/Dos Plus,** a card developed for the Macintosh Plus that allows users to run Macintosh and IBM applications simultaneously; **Mac/**

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Dos SE, for the Macintosh SE, with disk transfer and file conversion utilities; and **Mac/Dos II**, which operates with both the Macintosh II and Macintosh IIX.

Mac/Dos Plus is priced at $695, Mac/Dos SE is priced from $1,195 and the Mac/Dos II card starts at $1,595.

Perfectek, 1455 McCarthy Blvd., Milpitas, Calif. 95035. 408-263-7757.

Development tools

A menu-designing tool for IBM Personal Computers and compatibles has been announced by **Elvish Consulting**.

Elfmenu 1.6 allows users to create menus up to 30 levels deep, the vendor said, and keeps a log of programs that have run in order to demonstrate computer usage over time. The package is priced at $49.95.

Elvish Consulting, 414 E. Canedy, Springfield, Ill. 62703. 217-544-7799.

Greenleaf Software, Inc. has enhanced its C language library for software developers.

Greenleaf Datawindows 2.10 reportedly assists in the designing of window-, menu- and data-entry-oriented user interfaces within the C language environment. The latest release includes an improved hierarchical menu system and simplified function calls, the company said.

Datawindows 2.10 costs $295, including source code.

The company also introduced version **4.0** of the **Functions** C language library for DOS-based C programmers. The revised add-in library provides simultaneous mouse and keyboard input, data compression and decompression and video graphics display support, according to the vendor. It is priced at $209.

Greenleaf, Suite 570, 16479 Dallas Pkwy., Dallas, Texas 75248. 800-523-9830.

Genesis Data Systems has introduced the **Rapid Applications Development (RAD) System**, a series of prototyping tools and methods for developing IBM Personal Computer, Personal System/2 and compatible software.

The program consists of three major components: a screen design module with 16 foreground and 16 background colors; a prototyping language module to create interactive or self-running program prototypes, demonstrations and tutorials; and an assembly language routine for screen handling and file management.

The RAD System requires DOS 2.0 or higher and costs $299.95. Free technical support is provided.

Genesis Data, 8415 Washington Place N.E., Albuquerque, N.M. 87113. 800-777-1437.

Cadware, Inc. has released an enhanced version of the **Sylva System Developer** computer-aided software engineering tool.

The latest edition reportedly includes interactive screen prototyping and code generation facilities.

The PC-based tool kit also incorporates a diagram editor, team level data dictionary and a document formatter, the vendor said.

The release of Sylva System Developer will sell for the introductory price of $2,995 until March 31, 1989. After that, it will be priced at $3,495.

Cadware, 50 Fitch St., New Haven, Conn. 06515. 800-223-9273.

Flexus International Corp. has released **Version 1.2** of **Cobol SPII.**

The product was designed as a development tool to support prototyping and user interface management for PC Cobol applications, the vendor said. Version 1.2 reportedly includes scrollable fields on data-entry screens and complete field validation processing capabilities. It is priced at $395.

Flexus, P.O. Box 9119, Morristown, N.J. 07960. 201-895-4724.

Peripherals

Eicon Technology Corp. has announced that its laser printing products are now available for the IBM Personal System/2 Micro Channel Architecture environment.

According to the company, **Eiconscript** is a proprietary implementation of the Adobe Systems, Inc. Postscript language. The product reportedly interprets all Postscript commands, as well as all file commands. Used with the **Eiconscript Card**, the user may upgrade Hewlett-Packard Co. Laserjet IIs or Canon U.S.A., Inc. LBP8 IIs into compatible Postscript printers. The Eiconscript Card is bundled with the Eiconscript software and is priced at $2,075 for Personal Computers and at $2,275 for PS/2s.

Eicon, 2196-32 Ave., Montreal, Quebec H8T 3H7. 514-631-2592.

Two laser printers for the office environment have been introduced by **Olivetti USA**.

Designated the **PG 1260** and the **PG 1230**, the 12 page/min units feature a dual-component developer that aids print clarity, the vendor said. The PG 1260 is a tabletop device that supports as many as 10 workstations in multiuser personal computer networks and has a price tag of $9,195, the vendor said. The PG 1230 is said to incorporate three concurrent interfaces (one Centronics Data Computer Corp. parallel and two serial ports) that allow the printer to be shared simulta-

Continued on page 50

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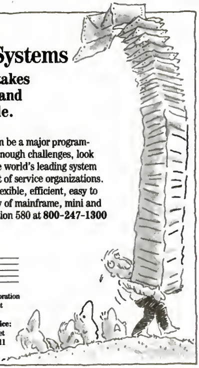

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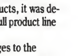

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neously by three systems. Six resident fonts are available in both portrait and landscape orientations. The printer costs $4,195.

Olivetti USA, 765 U.S. Highway 202, Somerville, N.J. 08876. 201-526-8200.

Computer Peripherals, Inc. (CPI) has added a flatbed image scanner to its family of **High Fidelity** personal computer peripherals.

The **Jetscan** reportedly offers 300 by 300 dot/in. resolution and works with IBM Personal Computer XT, PC AT and compatible computers. The scanner can input standard documents in 10 seconds, the vendor said.

The Jetscan costs $1,695. A minimum system configuration of 640K bytes of random-access memory and a 20M-byte hard disk drive is necessary for operation.

CPI, 667 Rancho Conejo Blvd., Newbury Park, Calif. 91320. 800-854-7600.

Goldstar Technology, Inc. has unveiled three IBM Video Graphics Array-compatible monitors.

The latest devices reportedly include the **Model 1220W**, a 12-in. paper-white analog monochrome monitor, which is priced at $199; the 14-in. **Model 1430VGA** RGB/analog monitor, priced at $659; and the TTL/analog multifrequency **Model 1440Super**, which is priced at $799.

Goldstar, 1130 E. Arques Ave., Sunnyvale, Calif. 94086. 408-737-8575.

Princeton Graphic Systems has introduced its second-generation 14-in. high-resolution color monitor.

The **Ultra 14** is compatible with the IBM Personal Computer, PC XT and AT and the Personal System/2, the vendor said, as well as with Apple Computer, Inc.'s Macintosh SE and Macintosh II. Maximum available resolution is 800 by 600 dot/in. The Ultra 14 costs $899.

Princeton Graphics, 601 Ewing St., Building A, Princeton, N.J. 609-683-1660.

Lundy Electronics & Systems, Inc. has announced a color graphics display system for the IBM Personal Computer AT, Personal System/2 and compatibles.

The **Lundy 1612** is said to offer a 1,600 by 1,200 dot/in. resolution display, and is especially suited for computer-aided design and engineering applications, the vendor said.

The 19-in. display system also features a graphics controller and 1M byte of display list video random-access memory, expandable to 8M bytes.

The Lundy 1612 costs $9,950.

Lundy Electronics, 1 Robert Lane, Glen Head, N.Y. 11545. 516-671-9000.

Board-level devices

Core International has released a Bus Master controller and proprietary software drives designed specifically for IBM's Micro Channel Architecture.

According to the vendor, the **CNT-MCA** hard-disk controller board allows IBM Personal System/2s to act as duplexed file servers with the System Fault Tolerant Software under Novell, Inc.'s Netware. The product has a reported transfer rate of 15 MHz and is incorporated with Core's MCA disk subsystem, which includes disks ranging from 40M to 650M bytes.

The CNT-MCA costs $595.

Core International, 7171 N. Federal Highway, Boca Raton, Fla. 33487. 407-997-6055.

Digiboard, Inc. has announced two multichannel, multiuser communications boards for the standard personal computer bus.

The **Digichannel PC/XI** series was developed for sophisticated applications, the vendor said, and features an on-board 12.5-MHz Intel Corp. 80186 processor. It is available with 128K bytes of random-access memory, expandable to 512K bytes. An eight-port version costs $1,595 and a 16-port version is priced at $1,995.

The **Digichannel PC/XE** series incorporates an 8-MHz Intel 80186 processor and includes 64K bytes of memory, the vendor said. Available in four- or eight-port configurations, the unit is priced from $695 to $995.

Digiboard, 6751 Oxford St., St. Louis Park, Minn. 55426. 612-922-8055.

A register-compatible IBM Video Graphics Array card is now available from **Tatung Company of America.**

Designated the **TVGA-8**, the graphics board reportedly runs with IBM Personal System/2 analog or multisync, Enhanced Graphics Adapter, Color Graphics Adapter and TTL monochrome monitors. The board offers a maximum resolution of 800-by-600 dot/in.

The TVGA-8 costs $359, including software drivers for Microsoft Corp. Windows, Lotus Development Corp.'s 1-2-3 and Symphony spreadsheets.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810. 213-637-2105.

Qualogy, Inc. has announced an Intel Corp. 80386-based computer engine that runs at either 16 MHz or 20 MHz, the company said.

The **QPC-5142** was reportedly designed for passive backplane systems, and offers up to 8M bytes of single LU line memory module, dynamic random-access memory on board. Two serial and one parallel I/O port are standard.

The price of a 16-MHz board without memory is $1,695 and is $1,995 for a 20-MHz configuration.

Qualogy, 1751 McCarthy Blvd., Milpitas, Calif. 95035. 408-434-5200.

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March 8, 1989	Santa Clara, CA — Santa Clara Marriott
March 9, 1989	Irvine, CA — Irvine Marriott
March 15, 1989	Boston, MA — The Copley Plaza

7:30
Registration/Continental Breakfast

8:30
Welcome/Introduction
Patrick J. McGovern,
Chairman, IDG
Thomas Swithenbank,
President & COO

The Industry Agenda: 1989
Thomas H. Willmott,
Exec. VP

Software Industry Review and Forecast
Robert Tasker,
VP, Software Research

Midrange and Unix Review and Forecast
Richard Schreiber,
VP, Systems Research

12:30
Luncheon

International Markets and Competition
David Moschella,
Senior VP, Computer Research

Communications Review and Forecast
Doug Gold,
Manager, Communications Research

Workstation Wars: The Battle for the Desktop
Vicki Brown,
Director, Systems Research

Personal Computing 1989: An Industry at the Crossroads
Aaron Goldberg,
VP, Microcomputer Research

5:00
Reception

Latest Oracle for PC wins users

BY PATRICK WAURZYNIAK
CW STAFF

BELMONT, Calif. — The latest version of Oracle Corp.'s Oracle relational database management system for MS-DOS personal computers appears to be winning support from the firm's loyal customers and early users of the product.

Oracle's Professional Oracle Version 5.1B for MS-DOS gives users the option of running Oracle's application development tools and utilities either above or below the MS-DOS 640K-byte memory barrier, thereby freeing extended memory for custom C language applications, said Gene Shklar, Oracle's director of marketing. The company's previous PC database Versions 5.1 and 5.1A could run its tools and utilities only in extended memory.

Professional Oracle Version 5.1B comes with Oracle's standard Oracle relational DBMS kernel, SQL Forms, SQL Plus and Pro C. It also sports three products new to the firm's PC version: SQL Reportwriter, SQL Menu and SQL Loader.

Oracle's newest tools and the database's overall portability are among the main attractions of the updated version for Earl Mott, manager of Haworth, Inc.'s advanced manufacturing and engineering systems.

Mott, who directs an Oracle development group that does inhouse applications development supporting the Holland, Mich.-based office furniture manufacturer's manufacturing and engineering functions, noted that the new version will be particularly helpful because of its additional tools and the SQL Reportwriter.

"We're a very heavy SQL Forms user," Mott said. He estimates his programmers favor this method for development about 90% of the time over the use of other fourth-generation language tools or Cobol-generated applications.

SQL Reportwriter for the PC version is a menu-driven report generator that can create single and multiquery reports in several formats, according to Oracle.

The SQL Menu is a fourth-generation tool for developing and running a common end-user interface for any set of applications. It also allows easier integration of Oracle into applications including Lotus Development Corp.'s 1-2-3 and Ansa Software's Paradox.

> "WE USE Oracle for what it's good at and Lotus for what it's good at. It's a very good marriage."
>
> EARL MOTT
> HAWORTH

The SQL Loader is a conversion utility that can move existing data from various formats, including 1-2-3 worksheets and Ashton-Tate Corp.'s Dbase III Plus files, into Oracle.

Mott said that the ability to create a database from existing 1-2-3 spreadsheets and keep the spreadsheet's characteristics helps Haworth's engineers and manufacturing employees.

"What we found is many, many people are using Lotus as a database system rather than as a spreadsheet," Mott said. "We use Oracle for what it's good at and Lotus for what it's good at. It's a very good marriage."

Mott also said Oracle's portability between PCs and Haworth's Digital Equipment Corp. VAX systems makes things much easier for his team of more than 20 programmers working with Version 5.1A on PCs.

"The portability that they talk about is indeed there," Mott said. "You can literally program on the PC and move it to other systems without modification."

Professional Oracle Version 5.1B also includes an enhancement of SQL Forms that is said to reduce screen I/O with a new terminal interface. The package comes with Pro C, Oracle's C language precompiler, and a subroutine call interface that now has a protected mode-debugging utility.

The updated database will be able to connect to remote databases using Oracle's SQL Net modules for DEC's Decnet, Transmission Control Protocol/Internet Protocol and asynchronous connections.

Floyd Beavers, manager of microcomputer resources at Congoleum Corp. in Trenton, N.J., said his company plans to get Version 5.1B through its maintenance agreement.

Congoleum, which Beavers calls "solidly Oracle," currently uses Oracle for inventory tracking and order entry on about 18 IBM Personal Computer XT- and AT-class machines that supplement the firm's Stratus Computer, Inc. minicomputers and an IBM mainframe. Beavers said the firm likes the forms generator for the PC that Oracle added to the latest version.

However, Congoleum likely could make more efficient overall use of Oracle's products if Stratus offered more support for Oracle and its systems, said Rich Andryszewski, Congoleum's project manager of systems.

Congoleum currently uses Oracle Version 5.021S on its Stratus machines and has an IBM 4300-class mainframe with Oracle 5.1 that will soon be updated to the Version 6.0.

Andryszewski, who said the Oracle PC databases are used for order entry and cost systems, finds the database easy to use for applications development but wants the increased performance offered by later versions.

Version 5.1B requires an Intel Corp. 80286 or 80386 PC with MS-DOS Version 3.1 or higher, a hard disk, 640K bytes of memory and at least 896K bytes of extended memory, with 2.5M bytes of extended memory recommended. The SQL Reportwriter requires 2.5M bytes of memory.

Version 5.1B sells for $1,299. A trial version of the software is priced at $199. Free upgrades are being offered to Oracle customers with customer service contracts.

Barney

FROM PAGE 41

Apple is now in the process of conceding the gigantic technical lead it had built under the leadership of Steve Jobs and the rest of Apple's personal computer revolutionaries. In fact, Apple showed the PC guys what to do, then stood mute while they went ahead and did it.

They must have been overconfident because, for the longest time, the IBM Personal Computer world was so rinky-dink compared with Apple and its Macintosh. The PC had memory problems and fragile, cumbersome 5¼-in. floppy disks. Meanwhile, the Mac had a wonderful architecture with gobs of usable memory and stable, small 3½-in. floppies.

While the Mac enforced a common look and feel, the PC suffered from user interface anarchy, with the closest thing to a standard being Lotus' 1-2-3. If you wanted to create a file, there were five different approaches for five different programs.

While the Mac got sexy new software such as Hypercard, animation programs and music software, PC users got such tired innovations as additional database programming commands.

But like a bald tire in a mud bog, the Mac is mired. Its multitasking is primitive, more like the task-switching that has long been available on the PC with $50 utilities.

The Mac, with its great software, is still a more alluring machine. Users become almost addicted to it because of its instantaneous productivity and

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ever-present fun factor.

This appeal will never change, but the appeal of the PC is about to become far greater. The PC is racking up breakthroughs every other week that are putting this little box from California to shame.

Let's talk real multitasking, as in different things actually happening at the same time. OS/2 provides this, as do a zillion other systems.

Want a nice addictive interface? Again, there's Microsoft Windows and the promise of its OS/2 Presentation Manager. And the PC stocks more esoteric goodies. Interprocess communications, a way of describing the ability of applications to share live data, has been around for a while in Windows and is now in Presentation Manager. The Mac makes you store to a disk file or clipboard before it is stuffed into another application.

Also, batch files, the things that confound end users but can dramatically alter the character of a PC, are not to be found in the good old Mac.

New PC buses such as IBM's Micro Channel are going to make the Mac look like an old horse. It used to do the job, but now it's about ready for the glue factory. These buses allow multiple processors to act in unison, unhindered. Actually, the Mac II, with its Nubus, has about the best bus of the lot. It's just that no one seems bent on truly exploiting it.

The Mac is also losing its leadership of the neat factor. The fun, attention-getting software used to come out first on the Mac. Desktop publishing, illustration and paint programs and weird database offerings such as Hypercard made users' pulses quicken.

Now the PC is getting its share. Lotus' Magellan is a program that lets users search files for a subject such as Mac-bashing, pull up a nasty column like this, invoke the word processor that created it and then E-mail it to friends with Macintoshes. Now that's neat software.

Until these PC offerings really come on strong, the Mac is fundamentally a better machine. But once the PC kicks in, however, it's good-bye Mac, hello PC.

Jerks who love to hate. Recently, this column contradicted writers who argued that Lotus Chief Executive Officer Jim Manzi was a major jerk. Basically, I said that, as a businessman, Manzi does what is right for Lotus and not what is right for his competitors or the press. Having had friends that others felt were aloof and arrogant but that I thought were kind and interesting deep down, I defended Manzi.

> ONCE THE PC kicks in, it's good-bye Mac, hello PC.

But many people, most of whom have never met Manzi, were offended by the column. Like the bad guy in professional wrestling, Manzi is someone they love to hate. Meet a bad-guy pro wrestler, however, and in most cases he's a joy to be around. But even some fellow journalists hated the column.

Others, particularly those who work at Microsoft, believed Lotus put us up to it. If they had read the horrible and nasty things we have written about Lotus time and time again, they would rethink that notion.

This column isn't afraid to criticize. But instead of bashing people, this column usually prefers to poke fun at companies and the silly things they do. Not people.

Heavenly Gates. It's true. We chided industry hero and Microsoft Chairman Bill Gates for his negative comments about a variety of things and people. It wasn't necessarily that Bill was wrong: It was that people take him very, very seriously, and a stray comment can have a big impact. Besides, Bill has gotten more good press than Gorbachev. Slapping around either one is blasphemy in most circles.

The item just happened to follow the piece on Manzi that questioned why writers who don't know him cast aspersions on his character. I led with a charming Lotus receptionist who had nice things to say about the man she sees just about every day.

Gates left a message recently to set things straight on his end. "My secretary really likes me, too," Gates joked, clearly vying with Manzi for the title of funniest PC software executive. Not only does your secretary like you, Bill, but so does 95% of the computing universe. The other 5% are competitors.

By the way. According to Manzi, there are six registered 1-2-3 users named Bill Gates and seven named W. Gates.

Barney is a *Computerworld* senior editor, microcomputing.

Mac database satisfies MS-DOS fans

BY JULIE PITTA
CW STAFF

LOS ANGELES — Nantucket Corp.'s McMax, a relational database for Apple Computer, Inc.'s Macintosh, is finding a bome with users who want to operate in both a Mac and MS-DOS world.

Database products have not been extremely popular among Mac users, according to Bill Higgs, industry analyst at Infocorp. The leading products in this category are flat filers rather than fully featured relational databases (see story page 43).

"The database market for the Macintosh has not been a booming success because of the type of user the Mac tends to attract," Higgs said, adding that IBM-style "PCs tend to sell into heavy-duty information processing environments, while the Mac's initial acceptance tends to be in graphics applications like design and desktop publishing."

McMax may find a niche in corporations because of its similarity to Ashton-Tate Corp.'s Dbase III, the leading database program for MS-DOS-based systems. Users said McMax is the only database available that emulates Dbase III. The similarity between the two programs allows users to move easily from an IBM Personal Computer running Dbase III to a Macintosh running McMax.

Recently, Los Angeles-based Nantucket updated McMax features such as support of large-screen and color displays. McMax Version 2.0 costs $295. Ironically, users said that McMax is more compatible with Dbase III than Ashton-Tate's Dbase Mac, a relational database for the Macintosh developed subsequently to Dbase III.

"Because of the skill set of our users, we wanted something as close to Dbase as possible," said Brian Riley, a vice-president at Citibank NA. "Dbase Mac has all the bells and whistles of a Mac program, but the operating environment wasn't what I wanted. Dbase Mac has flow-charting rather than the simple code you expect with Dbase III."

Nantucket Corp.'s McMax

Price: $295

- Runs on Apple Computer, Inc. Macintosh systems
- Requires 800K-byte floppy disk drive, 512K bytes of random-access memory

Riley said McMax was used to create a front end to a database residing on a Digital Equipment Corp. VAX. "Because of the closeness between McMax and Dbase III, it was easy for us to develop it on a PC and move it over to a Mac," be explained.

Anthony Oresteen, a vice-president at Continental Bank, said there are 1,800 MS-DOS-based PCs vs. 12 Macintoshes. "All the information I have in my division is on Dbase III," Oresteen said. "I need to access that information from my Macintosh. McMax looks more like DOS than the others. There are prompts and everything."

On November 24, 1988, IBM announced no new families of processors, software, peripherals or communication devices.

Most IBM employees were at home with their families. It was, after all, Thanksgiving.

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DEC's service

CONTINUED FROM PAGE 41

ence in Fortune 500-type organizations, MIS managers contacted said that DEC's credible reputation as a force in big business would make them consider the PCs in a DEC environment.

The main factor swaying MIS to take the deal seriously is neither Tandy's nor DEC's reputation as product vendors but DEC's reputation for service.

"At a large site, support and service is important," said Rich Meisenheimer, systems manager at Speech Systems, Inc. in Tarzana, Calif. "If three or four PCs break at once, you want that service right away. From an MIS standpoint, you want all the support you can get."

For MIS, it is worth it to pay a little extra to get the support and service, said Steve Hemaurer, PC support manager at Harris Trust & Savings Bank in Chicago. Hemaurer said that Harris holds Compaq Computer Corp. and IBM as standards setters because of the support and service criteria they impose on retailers that sell their machines. Since DEC will essentially offer the same — if not better — PC service, it makes those machines viable as a PC standard, Hemaurer said.

But Hemaurer and other MIS officials noted that the issue of the PC's initial cost tends to carry more weight than intangibles such as service in the minds of budget-conscious corporate purchasing agents.

"Although Tandy has a name in the industry, I would put more stock in their PCs with DEC's name being associated with it," said Doug Burdett, operations manager at General Datacomm Industries, Inc. in Middlebury, Conn.

"The attitude of [retailers] in the PC industry is that PCs are for hobbyists," Burdett said. "I would consider a PC being sold by DEC over the other [PC-compatible] vendors because DEC is in a better position to understand a company's needs in the corporate environment."

When asked if Tandy-made PCs could replace IBM's as a company standard, Burdett answered, "It's now possible but not probable."

Ostensibly, DEC users can for the first time choose from a complete line of computer systems, ranging from the Tandy-made 80286 compatible to the 24 million instructions per second VAX 6300. This is the widest breadth of product offerings a DEC customer has ever had.

Although it regards itself as a strict IBM PC shop, Hoffmann, La Roche, Inc. in Chicago may make an exception for DEC.

"It really depends on each department's needs," said Giesela Kaiser, a programming analyst. "But since we normally go through DEC for DEC equipment and get DEC service with it, we might test one."

Taking them seriously

Whether it is because of support, service, price or performance, the fact that these two vendors are being taken seriously as PC standards setters in corporate accounts is a huge boon to each. Separately, their reputations in the PC industry left something to be desired by MIS executives in large companies.

A possible result of this development, according to MIS managers, is that Tandy could shed its image as a not-so-serious computer vendor dabbling with overpriced electronics, while DEC could be vindicated for its troubled PC past.

Aside from service, minor technical adjustments have been made to the Tandy machines to make them DEC PCs. According to a DEC spokesman, the machines use a modified version of BIOS code made by Phoenix Technologies Ltd. in Norwood, Mass.

This was done to make the machines compatible with DEC peripherals such as printers, small computer systems interfaces and mouses. But the PCs will run standard DOS applications and are compatible with IBM Personal Computer keyboards, he said.

Mac CAD tool offers speed

HUNTINGTON BEACH, Calif. — A computer-aided design (CAD) package aimed at Apple Computer, Inc. Macintosh end users promises to deliver a significant increase in performance.

According to Versacad Corp., the recently announced fourth release of Versacad/Macintosh Edition (Version 2.1) handles refresh, zoom and pan operations at twice the speed of previous versions, while still maintaining floating-point precision for design accuracy.

The package also features radial and diametral dimensioning of arcs and circles as well as plus and minus tolerance dimensioning, upper- and lower-limit dimensioning and data dimensioning, Versacad said.

The company said that it rewrote links between Versacad/Macintosh Edition drawings and Hypercard stacks for more direct operations.

Versacad's is the first CAD product on the market that runs under Apple's A/UX operating system and enables end users to run both Macintosh OS and A/UX applications with complete file transfer between the two.

Verscad/Macintosh Edition is slated to be available this month at a suggested retail price of $1,995. Owners of the current version can upgrade to the new release for $195.

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Technology to the rescue

Adoption agency puts linked PCs to work finding homes for children

BY JAMES DALY
CW STAFF

WALTHAM, Mass. — When 4-month-old Korean orphan Melissa Kim slipped into the waiting arms of Edward and Catherine Landry early last year, years of hope and perseverance seemed to have finally paid off.

But one key figure in this drama remained unblinking offstage, away from the cooing and giggling and heartfelt delight: an IBM Personal Computer.

Melissa's quick placement was simplified with the assistance of a network of IBM PCs that International Adoptions, Inc. (IA) uses to smooth and speed the sometimes complicated and always laborious process of adopting a child.

IA is an arm of Holt Children's Services, a Korean orphanage founded during the Korean War by Bertha Holt. After spending several years renting office space in a local church, IA moved to its current headquarters in a 100-year-old renovated office building.

The agency was rapidly growing, placing hundreds of children from countries such as Korea and other war-stricken or poverty-stressed nations, including the Philippines, India, Thailand, Columbia and Costa Rica. While there was no shortage of parents interested in bringing children into their homes, the process of interviewing, researching the backgrounds of prospective parents and keeping records on as many as 800 ongoing adoption cases was withering.

The paperwork was still processed manually, bogging down an already complicated process. Two-inch thick manila files containing everything from painstakingly compiled records of applicant interviews to a running log of children who needed special medical attention choked filing cabinets.

Computers vital to progress

"Computerization was vital," said projects manager Mimi La Camera, who began building IA's computer network in 1986. Because IA is a not-for-profit agency that receives no federal or state funding, its setup needed to be lean but efficient.

A pair of IBM PC XTs and two printers were the first to join the agency's tiny computer operation. Another XT has since been added along with three IBM PCs, a PC AT that acts as a server and another pair of printers. La Camera said the agency skipped switching to the IBM Personal System/2 models because of the 3½-in. disk they use. "We can't afford to go completely high-tech," she said. "We just need familiarity."

Although their early computer use was limited to standard office work such as billing records, fee and donation information and word processing, the system has grown increasingly more complex and efficient. A key feature of the growing database is a mailing list that maintains files on more than 3,500 client and prospective client adoptive families. La Camera calls it "our greatest resource."

But the network's job is not over when the child has been placed. "Once the children come to this country, our job really begins," La Camera said. A growing database on parents now includes on-line information such as their professions, which helps to build a parental peer support network.

But the trip into the computer age has not been without bugs. Recently, workers began to notice that the contents of a screen would sometimes be dumped and replaced by the words "parity check." A maintenance engineer in the building, however, suggested that faulty power might be the villain. A voltage regulator donated by Sola Electric was installed to clean up the power entering the system, and the problems disappeared.

Bertha Holt (center) *and IA use networked PCs to help place children*

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Sun workstation offers MS-DOS applications

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Users looking for workstation functionality while maintaining compatibility with their installed base of MS-DOS-based personal computers are considering Sun Microsystems, Inc.'s Sun 386I.

The 386I, powered by an Intel Corp. 80386 microprocessor, runs the Unix operating system but also can invoke a Phoenix Technologies Ltd. software coprocessor to run MS-DOS applications. It is available in two versions: the Sun 386I/150, estimated to offer 3 million instructions per second (MIPS) of computing power; and the Sun 386I/250, with about 5 MIPS of computing power.

The systems have received what one analyst called a lukewarm reception, although early users reported that the 386Is are good for specific purposes.

Leo Hoarty, a vice-president at Paine Webber, Inc., said his firm has purchased a handful of 386I systems for use in software development, although it is unlikely that they will be purchased in volume for the trading-room floor.

Fast and cheap

"It's excellent for software development; they're very fast. And they're cheap; they cost the same as a Compaq," Hoarty said in comparing the Sun machines with MS-DOS-based Compaq Computer Corp. PCs. Traders who also use Unix-based workstations will migrate from Motorola, Inc. microprocessor-based systems to workstations based on reduced-instruction set computing (RISC) architecture.

"RISC systems will be cheaper and faster," Hoarty said. Paine Webber has standardized on Unix because it is "vendor-independent," and it provides users with more power than MS-DOS does.

Lou Wolfgang, a technical specialist at the U.S. Naval Ocean Systems Center, said the Sun 386I is being integrated into an Ethernet network supporting other Sun systems and IBM Personal Computers and compatibles.

"Unix allows you to do more things, especially in the multitasking area," Wolfgang said. The 386I allows users to run an MS-DOS application in a window with Unix running the background. Users more familiar with MS-DOS can avoid the Unix editor feature, which is considered cumbersome by some, he added.

The center is porting an acoustic data collection system from a Digital Research, Inc. CP/M-based system running Turbo DOS to Sun's 386I. The 386I acts as the orchestrator of the system that collects acoustic data in real time. Porting from the older U.S. Navy computer to the Sun 386I proved relatively simple, Wolfgang noted.

The 386I is Sun's attempt to gain acceptance for Unix among traditional IBM PC users. David Burdick, a vice-president at Dataquest, Inc., a San Jose, Calif. market research firm, said the 386I was greeted with a lukewarm reception.

The Sun 386I/150 is priced at $8,490, while the 386I/250 is priced at $12,740.

Volkswriter 4 tunes grammar

BY DOUGLAS BARNEY
CW STAFF

MONTEREY, Calif. — Word processors are good for cranking out sentences but are no help when the stuff is shabbily written.

That is where Volkswriter 4 from Lifetree Software, Inc. steps in. This $195 executive-style word processor comes with a unique, built-in grammar-checking system. The grammar software, called Correctext, was previously available only on Digital Equipment Corp. VAX computers.

Book publisher Houghton Mifflin Co. devised the system with the help of noted linguistics expert Henry Kucera, a professor at Brown University.

Suggestions only

Correctext actually parses, or pulls apart, sentences to examine their structure. The system can review a document one sentence at a time or scan the entire document. After its review, the software makes suggestions that writers can use or ignore. "We want the user to control it," noted Alwin Carus, editorial director at Houghton Mifflin, who said the goal was to make the machine nonauthoritarian.

The system is also said to be flexible and allows users to bend the rules of grammar for things such as split infinitives. "You can select the degree of splitness or nonsplitness," Carus said.

Houghton Mifflin is currently negotiating a number of other OEM agreements and is targeting computers of all sizes. The firm is also looking at opportunities in desktop publishing, office automation, electronic publishing, electronic typewriters and handheld computers. Houghton Mifflin itself will implement the system for its editors later this year on VAX computers.

Volkswriter 4 is currently available and requires an IBM Personal Computer or compatible with at least 640K-bytes of random-access memory and a hard disk drive.

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Microsoft

CONTINUED FROM PAGE 41

Microsoft that a graphical interface was the way to go.

"Once people experience graphics, it is really infectious," noted Peter Higgins, general manager of Microsoft's analysis business unit. Microsoft Chairman Bill Gates himself has crisscrossed the country campaigning for Microsoft Windows, a graphical user interface for IBM Personal Computers.

Microsoft hopes to strengthen its position with a multiplatform approach diametrically opposed to that of rival Lotus. Lotus plans to provide the same product, its 1-2-3 spreadsheet, across a variety of platforms, with an emphasis on running on host computers. Microsoft, however, plans to embrace the major PC platforms and will only connect to host computers.

Microsoft's Gates

"We are going to build a common set of applications across the popular desktop platforms. We are not trying to build host versions or minicomputer versions," Maples said. Maples replaced Gates as vice-president of applications and is charged with executing the game plan that Gates devised during the past several years.

Like Lotus, Microsoft's approach uses the so-called common engine approach. This way, programmers write one set of source code to support most features that is then tailored and optimized for different PC systems.

The sincerity of this effort was displayed in a recent reorganization that eliminated divisions based on PC type and created divisions around applications areas.

In fact, Microsoft also has one employee, Tandy Trower, who acts as a "user interface cop" and ensures that applications employ similar interface techniques.

According to Microsoft, the common engine approach allows programmers to focus on perfecting particular features, rather than waste time worrying about the underlying architecture.

This is particularly important for the Seattle-area firm, which has already scooped up a good many of the region's best programmers. According to some sources, certain Microsoft projects have been held back simply because the firm lacks programmers. Gates has looked as far away as India to find coders.

To some extent, Microsoft products have already implemented this approach. Microsoft Excel, an integrated spreadsheet product, is available on both the IBM Personal Computer and the Macintosh.

In fact, the PC version was based in large part on the firm's pioneering Macintosh efforts.

The same thing will essentially happen when Microsoft Word for Windows ships later this year. This product will feed off the features and the look of Microsoft Word for the Macintosh, currently the leading full-featured word processor for the Macintosh market.

Common engine pudding

Microsoft Works, another integrated application, is available in both environments but has yet to receive a full dose of the common engine pudding. This low-end integrated package actually looks and acts differently on the PC and the Mac. Once it runs under Windows on the PC, however, those days will be over.

The dynamic-link libraries supported by Windows and Presentation Manager is another method of ensuring applications commonality.

These libraries allow programmers to develop one module, such as a drawing program, that can work in a variety of applications. This will eventually eliminate a good many arbitrary differences between Microsoft applications.

Eventually, the common engine approach will allow Microsoft to update applications in bunches, with new versions for all three platforms hitting the market in the same month. This should begin this year, officials said.

Within two years, the cross-platform strategy will have created an entire family that shares a look and feel, common modules and, of course, data.

Microsoft's biggest challenge will be carving out a larger slice of the PC spreadsheet market, still dominated by Lotus' 1-2-3. Part of this effort involves being the first out of the chute with a sophisticated application for OS/2 Presentation Manager. Higgins said the firm is shooting for the first half of this year with a $50 upgrade of Excel.

According to Higgins, PC Excel has captured between 10% and 12% of the overall U.S. spreadsheet market. Lotus pretty much still has the rest. "The hardest part is inertia," Higgins said.

Higgins is not impressed with Lotus' multiplatform spreadsheet strategy. "I don't think having a spreadsheet on your mainframe or your VAX is compelling," he said.

Once the firm's graphical applications strategy matures, support costs should go down. "I am going to be the lowest cost to support. Graphical applications are half the number of calls and half the time it takes to solve calls as the nongraphical applications," Maples claimed.

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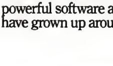

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DATA STREAM

Patricia Keefe

DEC-Apple union shows maternal look

OK, now that the honeymoon is definitely over, we're all waiting for the pictures. Maybe when they arrive, we can glean exactly what it is that Apple and DEC have been doing over the past year, because this is one team that does not seem to have accomplished much in the eyes of many users and analysts. But I think it's time to take a closer look.

At their nuptials a little over a year ago, the beaming couple pledged to provide an officially blessed framework that would unite their uncommunicative offspring — Appletalk and Apple Macintoshes to Decnet and VAX Systems [CW, Jan. 18, 1988] — and lead to a new generation of applications.

I agree that such a framework is a vitally important step, but that glittering ceremony was veiled in rhetoric and short on essential close-ups such as pricing, availability and products. When pressed for specifics, the newlyweds just gushed, "Details in August," before speeding off.

Users were not particularly

Continued on page 68

FDDI peeks around the corner

Late 1989 promises developments critical for speeds up to 100M bit/sec.

BY PATRICIA KEEFE
CW STAFF

The history of networking is such that whenever something is talked about a lot, you can safely assume it is not yet ready for commercial application.

Up until now, users have heard quite a bit about the promise of 100M bit/sec. Fiber Distributed Data Interface (FDDI) networks. It is true that the future is not here yet, but according to a poll of vendors and industry analysts, it is no further than six to 12 months down the road.

The latter half of 1989 should bring about four advancements critical to users already chomping at the bit over network speeds as high as 80M bit/sec., including the following:

- A final-draft FDDI standard, currently held up by discussions over the station management portion — the last of four documents within the standard.
- Volume shipments of Advanced Micro Devices, Inc.'s (AMD) second-generation chip, the ENDEC-2, which provides a smoother algorithm and is currently in beta testing, according to Patrick Green, AMD's strategic development manager for high-end networks.
- If not actual product announcements from Digital Equipment Corp. and IBM, then — at a minimum — very detailed statements of direction from both vendors.
- A year-long steady stream of FDDI products from third parties, led by early market entrants such as Fibronics International, Inc., Fibercom, Inc. and Simplenet.

Further fueling the push toward 100M bit/sec. local-area networks are the following:

- The increase in buildings being wired with fiber-optic cable.
- The growth in metropolitan-area networks and campus environments, both of which are beginning to take advantage of the fiber cable already laid in many cities by local carriers.

"Most users are looking at 4M, 10M and 16M bit/sec. Token-Rings for LANs," said Mark Freund, a consultant and principal with Interconnect Network Consulting Group in Pasadena, Calif. "But for backbones, they are asking [us] whether they should pull fiber cable for FDDI."

Who wants it?

The kinds of users who are really pressing for FDDI speed include those doing wind tunnel simulations on supercomputers or using high-resolution graphics or performing billing applications whereby paper is digitized and stored as a digital image on an optical disk and then keypunched over the network, said Howard Salwen, chairman and founder of Proteon, Inc. More customer service and faster response times are what these users are looking for, and they need a very wide bandwidth to do it.

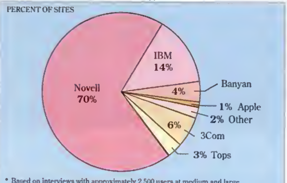
These users will wait until the FDDI standard is put to bed, which is mostly a matter of resolving a few issues in the connection and configuration man-

Continued on page 67

Data View

Pick of PC LAN software

*Businesses planning to buy PC LAN operating systems favor Novell as their supplier**



* Based on interviews with approximately 2,500 users at medium and large U.S. business sites

SOURCE: COMPUTER INTELLIGENCE
CW CHART: JOHN YORK

Utility gambles on fiber optics

BY J. A. SAVAGE
CW STAFF

TEMPE, Ariz. — Anticipating future networking needs, Central Arizona's water and electric utility, the Salt River Project Agriculture Improvement & Power District, is consolidating its information systems into a prewired, "smart" building over Presidents' Day weekend. The year-long effort constitutes a gamble on IBM's forthcoming fiber-optics offerings.

Information services are now spread throughout three buildings and one trailer located several miles apart. But next week, if all goes well, two mainframes, hundreds of personal computers and peripherals and 60 of Salt River's 300 systems employees will be moved in the first phase.

The new IS building was designed to handle the latest in networking technology — including 100M bit/sec. Fiber Distributed Data Interface networks, Integrated Services Digital Networks (ISDN) and a digital switch — when its use be-

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Inside

- Avanti's Open Network Management will talk to and take on AT&T's UNMA. Page 61.
- Coconet's Tree Server narrows the gap between MS-DOS, Unix. Page 67.

Price caps: A road to deregulation?

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The price-caps regulatory scheme proposed by the Federal Communications Commission just may be a "waystation" on the road to eventual deregulation of AT&T's interstate rates, an FCC staffer said here at Communication Networks '89 last week.

The FCC's proposal would remove all profit ceilings from AT&T but also place a cap on AT&T rates to protect ratepayers. The scheme is intended to give AT&T a profit incentive to cut costs and become more efficient.

John R. Haring, chief of the FCC's Office of Plans and Policy, said a price-cap regime would provide a transition to deregulation by testing the extent of competition in the interstate telecommunications market. Competition may force AT&T rates so far below the FCC price cap that the cap becomes meaningless, he said.

In that case, a formal declaration that AT&T is deregulated would be unnecessary, Haring said, presumably because at that point, profit ceilings would be gone and price ceilings would be ineffectual.

But Gerard Salemme, senior policy analyst at the U.S. House of Representatives Subcommittee on Telecommunications and Finance, cautioned that if price caps are a vehicle for AT&T deregulation, then the FCC needs a full-scale proceeding to investigate the state of competition in the interstate market.

Otherwise, Salemme took a conciliatory tone toward the FCC proposal and said Congress wants to work with the FCC to develop an alternative to the present system of rate-of-return regulation, which has been criticized for allowing carriers to recoup all their costs from ratepayers.

Salemme said Congress appreciated the FCC's recent decision to delay a vote on price caps so that legislators can study the details of the proposal and hold a hearing on Feb. 28 [CW, Feb. 6]. The subcommittee has asked the FCC to provide a computer model projecting the effects of price caps on residential and business users, he added.

Price caps complicated?

Despite the talk of deregulation, Haring acknowledged that price caps are possibly more complicated than the current regulatory system.

Under the price-caps scheme, AT&T's price ceiling would be adjusted annually for inflation, minus a 3% productivity factor to reflect the industry's historical productivity improvements. The whole system may later be applied to local telephone companies as well.

Salemme said the key to the price caps debate is the productivity factor, since a miscalculation could shift billions of dollars from consumers to shareholders. Business customers have argued that the FCC's proposed productivity factor is far too small to give users any substantial rate cuts [CW, Aug. 1, 1988].

Haring said the FCC has added several bells and whistles, including the productivity factor and a so-called automatic stabilizer, to the price-cap plan to ensure that consumers get a share of the benefits.

The automatic stabilizer, which would apply only to the local telephone companies — because they have monopoly power — would ensure that any "obscene profits" above a certain threshold would be earmarked for ratepayers, according to Haring.

Saving bytes with emulators

BY PATRICIA KEEFE
CW STAFF

User concern over mounting system overhead has inspired the release of new or revamped versions of network software said to feature less code.

Icot Corp. in San Jose, Calif., recently unveiled a series of memory-conserving remote terminal emulation products and gateways as part of its PCpath and Netpath families. The Ksaver micro-to-mainframe series is targeted at installations facing memory constraints due to large MS-DOS applications.

"Users are becoming increasingly memory-conservative as applications get larger," said Dan Price, a product marketing manager. "Terminal emulation sucks up a lot of memory — as much as 100K to 300K bytes."

Leftovers

For users in emulation mode, the issue becomes how much memory is available to do anything else, thanks to the 640K barrier, said Leslie Lord, an analyst at International Data Corp. in Framingham, Mass. [CW, Feb. 6].

This could be one factor behind flat terminal emulation sales for some vendors. Icot claimed that tighter code is actually helping it win accounts.

PCpath Ksaver and Netpath Ksaver reportedly require only 70K to 80K bytes of personal computer memory to provide three IBM host sessions in either a stand-alone or local-area network gateway environment. LAN users have to cope with added pressure from network operating systems and IBM Netbios interface overhead.

Ksaver boosts less than half the amount of memory used by most competitive multisession packages, the vendor claimed. The trade-off here can be fewer features. "The 3270 emulation market is evolving into memory-sensitive and feature-intensive segments," said Kenn Dahl, a vice-president at Icot's Network Systems Division.

Ksaver supports IBM's high- and low-level applications program interfaces, S3G color graphics and 3278 Models 3 to 5, virtual circuit communications and either X.25 or IBM Synchronous Data Link Control (SDLC) protocols. Single-user PCpath Ksaver costs $750 for SDLC and $850 for X.25.

Netpath Ksaver gateways list for $1,595 for eight logical units and $3,595 for 32 logical units for both SDLC and X.25.

A configurable LAN operating system said to operate in expanded memory or "shadow random-access memory," thereby reducing DOS memory requirements to less than 10K bytes, was recently unwrapped by Invisible Software, Inc. in San Francisco. The memory-resident components of NET/30-Expanded Memory Support (EMS) include 3K bytes for workstation software, 5K for file server software and 1K for electronic mail. The software runs on Invisible's proprietary and Ethernet LANs.

NET/30-EMS is said to be the first network operating system to support EMS 4.0, which adds up to 32M bytes of memory, as well as shadow RAM. Shadow RAM is located between 640K and 1M bytes in the space normally occupied by IBM BIOS read-only memory. The package allows users to expand DOS memory beyond 640K to 704K bytes.

The product combats memory-hungry programs that make it impossible to install a memory-resident LAN. Even programs making use of expanded memory occupy extensive DOS memory, making it difficult to coexist with LANs, Invisible Software said.

With some hardware memory requirements, NET/30-EMS wil be included free of charge with every Invisible Network and Ethernet board. Pricing for the system ranges from $215 to $399 per node. Current users can obtain an update free or for a small charge, depending on their configuration and purchase date.

The next generation of desktop computers may already be on your desks.

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UNMA gains rival, supporter

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Avanti Communications Corp. unveiled a network management system last week said to communicate and compete with AT&T's Unified Network Management Architecture (UNMA).

The system was demonstrated here at the Communication Networks '89 show last week.

Avanti's Open Network Management system, like the recently announced latest version of AT&T's offering, is based on a Sun Microsystems, Inc. workstation and includes an SQL database management query system. The system also shares UNMA's ability to collect network fault data from a hybrid network.

Avanti and AT&T have been working closely on a link that would allow Open Network Management to send alerts and alarms to AT&T's UNMA workstation, the Accumaster Integrator, according to Avanti President Tom Taylor.

But while Avanti has committed itself to providing this product by the end of the year, it has not completely bought into AT&T's concept of network management, which naturally puts AT&T's own system at the center.

Master of the house

"They see themselves as master manager of networks, but Open Network Management could also be a master management system or a peer with other systems," Taylor said.

A number of major Avanti customers said they do not want to centralize their network management systems around AT&T's products, he added.

Thus, AT&T's insistence on this type of configuration makes it difficult for companies such as Avanti "to keep in lockstep with AT&T's development," Taylor said.

Open Network Management, which was developed jointly with Bell Atlantic Corp. subsidiary Technology Concepts, Inc., is said to provide multilevel, full-color network graphics, an Oracle Corp. database management system for historical analysis and capacity planning and an X Window System-compatible interface that was designed to allow users to establish sessions with other vendors' network management systems on different segments of the screen.

Supportive

The system is said to support the Open Systems Interconnect networking protocols and the Microcom Network Protocol; it will eventually support the International Standards Organization's Common Management Information Services Protocol as a way to communicate with other vendors' network management systems, Taylor said.

In the meantime, Avanti and Bell Atlantic are jointly developing software to provide Open Network Management with input from a variety of vendors' networking devices.

Both companies said they plan to use the software, as well as Open Network Management, as the basis for a multivendor network management system that can be geared to meet the specific needs of users, Taylor said.

Avanti's current Open Network Management platform is able to monitor alerts and alarms and initiate loopback tests on any network service that complies with AT&T's Digital Access and Cross-Connect System architecture, such as AT&T's Accunet services, Taylor claimed. The system is also said to monitor alarms from Subrate Digital Multiplexing services that break up a 64K bit/sec. link into smaller increments that can be routed separately.

Open Network Management is scheduled to be available by the end of the second quarter, according to Avanti. Pricing varies widely depending on configuration and features included.

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Fiber optics

FROM PAGE 59

comes financially feasible.

The transition is expected to be completed by year's end.

"The new building was not designed to save money," data processing manager Robert Tellef said. With personnel jammed into buildings several miles apart, savings from centralization was not a priority. "We will double our space for CPUs and DASDs. Now they're so jammed in, we can't breathe."

The utility supplies electricity and water to 500,000 customers. It also owns dams, nuclear plants and fossil-fuel generating facilities. IS handles the daily billings for Salt River's customers and runs financial and engineering applications, as well.

A half mile away from the new facility is the old center of operations. Linking it with the new building is a freeway of wire — 2,000 strands of standard telephone wire and 100 pairs of fiber-optic cable, according to Terry Walker, manager of data communications.

During the transfer, the old central mainframe office will be used as a hub to avoid outages while the new system goes in, Walker said.

When the old hub is discarded, much of the old networking equipment will be discarded as well. Modems, wiring, patch facilities and digital switching devices displaced by the new building will be packed away to accommodate future growth, Walker said. Larger, more sophisticated devices will be rerouted.

But the development, which ultimately will include five Salt River buildings and some commercial and residential structures, will remain restricted to the IS building for the next couple of years, Tellef said. Information systems, while centralized, will also be physically isolated during that period.

Buildings linked with fiber

When complete, Salt River's headquarters buildings will be linked with fiber-optic cable, but no decision has yet been made on whether future buildings will use the fiber-optic wiring within each building, according to Walker. Until then, communications with non-IS departments will be maintained with standard cluster controllers.

Each level has a cabled, raised floor with voice, data, power and backup power available for each desk via a plug-in strip. "The first two floors have a two-foot raised access if we need to expand further," Tellef said.

The building uses both IBM Type 3 shielded and Type 1 unshielded twisted-pair wiring. The shielded transfer rate is 16M bit/sec., and the unshielded transfers at 4M bit/sec. Initially, Walker said he expects to depend on the shielded wiring to network terminals for IBM 3270 terminal emulation. Eventually, he plans to use the unshielded wiring for a Token-Ring network. While the company wanted to implement Token-Ring in the new building as it has on a small scale in the current facility, it does not make sense to do so until the smart building and a new computing environment are in place.

"As the bandwidth continues to grow, our wiring will accommodate it," Walker said. The Token-Ring network will start with a 4M bit/sec. bandwidth and be upgraded to 16M bit/sec. by the end of the year.

Fiber-optic Token-Ring backbones are an option. "We expect IBM to make an announcement regarding [its plans for] accommodating 100M bit/sec. on such LANs. We could then use it for large graphics and imaging," Walker said.

The local-area network migrated over from the old building will kick off with 170 people, according to Walker. In 18 months to three years, that number will surge to 760 people on the LAN. "Token-Ring is promising because we're a large IBM shop" with one 3090 Model 400, a 3084 and a 4381, Walker said. "Since we're developing strategic Systems Application Architecture applications, Token-Ring fits in."

At some point, Tellef said, Salt River expects to be its own phone company, employing a low-end digital switch. The cost could run as high as $2 million.

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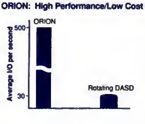

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"The FDDI Report" is available from Architecture Technology Corp. for $250. The study takes an in-depth look at the 100M bit/sec. Fiber Distributed Data Interface (FDDI) standard, covering the technical and operational details as well as emerging vendor product lines. More information is available by calling the company at 612-935-2035.

Kazcom, Inc. has released ***Interactive ISDN***, a self-study program that teaches Integrated Services Digital Network concepts, structure and protocols. The course includes five disks and is divided into 12 modules. It runs on an IBM Personal Computer XT, AT or Personal System/2 and requires a minimum of 265K bytes of memory and an IBM Enhanced Graphics Adapter, Color Graphics Adapater or Video Graphics Array. It costs $750.

The Society of Manufacturing Engineers (SME) is marketing four videos featuring executive presentations on computer-integrated manufacturing given at Autofact '88. The half-inch VHS tapes cost $40 each ($35 for SME members) or $130 ($115 for members) for all four. Order from SME, 313-271-1500, ext. 418 or 419.

The videos feature Robert Hanson, chairman and chief executive officer of Deere & Co.; Thomas Murrin, past president of Westinghouse Corp.'s Energy and Advanced Technology Group; Ken Olsen, president of Digital Equipment Corp.; and John Sculley, president and CEO of Apple Computer, Inc.

SME also has two publications of interest. **"A Program Guide for CIM Implementation, 2nd Edition,"** is said to be a guide for charting a well-organized path to achieving CIM. It costs $42, and its order code is 1312-0732. **"Integrating the Automated Factory"** provides a source for understanding management strategies and responsibilities in automation projects and includes case studies. It costs $42, and its order code is 1309-0732.

Start returning those warranty cards for **Novell, Inc.** products pronto. Users who do so within 10 days after purchasing Netware operating systems between Jan. 3 and Feb. 15 will receive a free copy of **Quarterdeck Office Systems Inc.'s Desqview** — a package that lists for $129.95. Purchasers of SFT Netware will receive two copies of the multitasking and windowing environment for DOS-based networks. Novell also reported that its installed base topped 300,000 units by Oct. 29, 1988, the close of its fiscal year.

Coastcom Co., a supplier of T1 products, has announced expanded support for **AT&T's** Unified Network Management Architecture. Coastcom's Network Manager will work with AT&T's Accumaster Integrator. By the third quarter of this year, Network Manager will be able to pass alarms or remote signals to Accumaster, according to the company.

Information Gatekeepers, Inc. plans to publish a newsletter devoted to the broadband industry, which it estimates will become a multibillion-dollar market within the next few years. Sample copies are available from the company at 214 Harvard Ave., Boston, Mass. 02134.

Transettlements, Inc. has joined the growing ranks of electronic data interchange vendors who have dropped additional charges for internetwork transmissions. It will not charge its users fees, penalties or premiums for interconnection with other value-added networks. In short, the charge for going through two networks to a trading partner will be the same as the charge for going through only Transettlements' network.

Nintendo of America, Inc. is supplying its 130 merchandising representatives with handheld data collection computers from **Panasonic Industrial Co.** Equipped with bar code readers, the data collection devices can collect information on product condition, inventory levels and displays and send reports to the video games manufacturer's headquarters via modem.

Novell has certified that the ArchiveVP and Archive XL streaming tape subsystems from **Archive Corp.** are compatible with Novell's Netware network operating system.

Why spend money on computers when you can make money on computers?
UN
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Net server unites MS-DOS, Unix

Coconet's tree server allows Ethernet multitasking access

BY JAMES DALY
CW STAFF

CORAL GABLES, Fla. — The gap between MS-DOS and Unix may have been narrowed recently with Coconet, Inc.'s introduction of a network server system said to give MS-DOS users access to a transparent multiuser and multitasking Unix networking system.

According to Coconet President Tony Ardolino, the union was made possible through the use of the Coconet Tree Server, an IBM Netbios-compatible distributed file system that couples the speed of a 10M bit/sec. Ethernet network with software that provides multiuser, multitasking access to files and applications.

Ardolino also noted that all Santa Cruz Operation Xenix 2.2.3 services are available to each of the personal computers connected to the network as well as 32 or more dumb serial terminals.

The server is based on a 25-MHz Intel Corp. 80386 microprocessor and offers users drives D through Z with no partition or size restrictions. It has nearly 380M bytes of hard disk capacity on a single drive.

The server also offers MS-DOS commands on Unix files, Unix services on MS-DOS files and MS-DOS-to-Unix and Unix-to-MS-DOS file transfers, the company claimed.

Other features include 4M bytes of 32M-byte memory, a 1.2M-byte floppy disk, an optional 380M-byte hard disk and controller, an Ethernet card, a 150M-byte tape drive remote diagnostics/management modem and an uninterruptible power supply. One year of on-site maintenance is also included with each tree server.

According to Coconet, the tree server is priced at $19,995 and is available immediately.

FDDI peeks

CONTINUED FROM PAGE 59

agement areas, Salwen said. "I think that after the summer or in the fall, we'll have a fairly solid last piece of the standard done and submitted."

More compelling, Salwen said, is establishing interoperability between each vendor's interpretation of FDDI. He predicted a long shakeout period "where we get to be interoperable with each other."

Cost is also an issue. "Commercial users are getting ready, but when they look at the cost of FDDI, they say, 'Why not go to fiber-optic [10M bit/sec.] Ethernet and wait?' " said David Terrie, president of Newport Consulting in Salem, Mass.

Large networks

As for AMD's chip, Green denied charges by some vendors such as Proteon that ENDEC-1 could not handle large networks. "Not a chance," he said, when asked if that was true. Still, Salwen said he worries, citing the experiences of several university users with thousands of nodes linked to 50 to 70 routers attached to fiber backbones. These users' simulations with ENDEC-1 started to fail on much smaller networks, he claimed, where a lot of packets were dropped and the network failed to reach 100M bit/sec. capacity.

"What we need is a large-scale demonstration to show that FDDI works," he said, adding that such a demonstration was once under consideration.

Analysts quibble over whether DEC or IBM is further ahead in the FDDI race, but what is important to users is that both vendors have expressed strong commitment to FDDI.

"I think you'll see IBM being very aggressive here, with an offering sooner than people expect," said Freund, noting that IBM tends to hang back and take its time in other markets. Possibly spurring IBM is its winning bid to construct a fiber network for the National Aeronautics and Space Administration. "IBM already has prototype cards for the AT and Micro Channel Architecture," he said.

IBM's FDDI architecture is designed to interoperate with T1, T2 and T3, while providing gateways into public networks, according to Freund.

Freund was briefed on IBM's progress on FDDI in December by Hanafy Melee, a senior manager of IBM's High Bandwidth Systems Laboratory, and Kenneth Ockeltree, a research staff member at the Communications Systems Research Division.

While users wait for IBM and DEC, they can placate their needs with products from a number of third parties. FDDI products currently shipping can only claim to be compatible with an emerging standard. Users should be aware that software upgrades are likely once the document is settled.

If life in the 100M bit/sec. fast lane is not sufficient, then users can look toward what is known as FDDI-2, a 200M bit/sec. version, said Larry DeBoever, a consultant at Larry DeBoever Associates. FDDI-2 would require AMD to make some minor changes at the physical layer and add a Hybrid Ring Controller chip to its FDDI chip set. Green would say only that AMD is interested in FDDI-2, which he noted is much further down the road. Also, rumors circulating last year had Proteon looking into a 500M-bit fiber-optic backbone.

Most CEO's and senior managers look at computer operations as cost centers, not profit centers.

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CONTINUED FROM PAGE 59

impressed. They figured it was about time that Apple and DEC took notice of the thriving third-party market linking Macintoshes with VAXs. Nor were users as secretive. They made their expectations plain: transparent peer-to-peer relationships, standardized communications and host connections. Meanwhile, third parties are laughing all the way to the bank.

On cue in Boston's August swelter, Apple and DEC again linked arms and unveiled specifications for client and server implementations that provide support for SQL and CL/1 databases — the fruits of which were seen at Dexpo East '89 last week in New York. These included multiple product unveilings from third parties and an Apple-DEC integration center that linked products from 37 vendors.

"We have agreed on [how to handle] CL/1, electronic mail and compound documents," said Deane Curran, DEC's group manager of PC Computing Integration.

> JUST WHEN we were beginning to wonder, "Can this marriage be saved?" DEC and Apple pulled a few bunnies out of their hats at last week's show.

The Boston briefing also produced a long list of more promised connectivity. But the bottom line remained a six-month lag before commercial product delivery.

Users have remained chary. It may be true that their expectations have exceeded Apple and DEC promises, as suggested by spokesmen from both companies. "I think users are expecting more from the relationship than either DEC or Apple has committed to," Curran stressed. If that is the case, I think vendor hype is to blame.

The alliance is supposed to produce a key set of specifications that both companies agree on and will work toward implementing in their systems, according to Curran and Michael Zivkovic, Apple's manager of DEC Marketing Programs. But I still don't think users' expectations for this union are unreasonable.

Up until Dexpo, what we had gotten was close to zero. A lot of smiles, a lot of hyped commitment and *some* specifications. So, just when we were beginning to wonder, "Can this marriage be saved?" DEC and Apple pulled a few bunnies out of their hats at last week's show.

All of which is reassuring, because an Apple spokesman dropped a stunner of a hint last week by suggesting that Apple may not necessarily introduce products. Hmmm. Does this signify a retreat?

To listen to Zivkovic, nothing could be further from the truth. His statement that Apple and DEC will "definitely," albeit separately, be releasing some products before the end of the year was echoed by Curran.

Well, let's see. A developer's tool kit is still slated for a summer release, according to Curran. In August, Apple promised the following capabilities by the fall of 1989: Appletalk for VMS and Appletalk-Decnet Transport Gateway, both of which will provide the basis for developing applications that access both systems; and Apple support for two DEC standards for encoding compound document components and for DEC's remote procedure calls.

Also, Apple has committed to providing an X Window System-based server that will allow Mac users to access Decwindows-based applications, Curran said. For its part, DEC plans to provide software similar to VMS Services for DOS that will support both Mac and DOS users, he added. Alisa Systems will play a key role in this development.

Both vendors have to tweak their respective product lines to accommodate some of the promised connectivity.

"That work is in progress," Zivkovic said, noting the integration of both environments calls for a huge, complex effort.

Of course, there are still pieces yet to be promised, never mind delivered. We still don't know whether Apple and DEC plan to accommodate Unix in their connectivity guidelines. Apple has seemed more open to this accommodation than DEC. In August, Apple said there were no plans for specifying a third-party application programming interface for integrated management of multivendor networks. Clearly, this must be addressed.

So 13 months later, we still have a very pregnant partnership. There's definitely some work going on here and some guidelines have been released. Third parties appear to be encouraged, judging by the eight or so who announced Mac-to-VAX products at Dexpo. But as users so rightly grouse, the bulk of this relationship has yet to be delivered. Until it is, it is worth considering these thoughts from Frank Dzubeck, president of Communications Network Architects.

Dzubeck believes that alliances are "an '80s trip." He said users are getting fed up with vendors jumping into bed with every Inc., Co. and Corp. that crosses their path, and they are beginning to wonder just what they stand to gain from all this hand-holding. Come the fall, I think we'll know.

Keefe is a *Computerworld* senior editor, networking.

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We call it HP AdvanceNet. An open, highly efficient networking solution for multi-vendor environments.

"A few years ago, Hewlett-Packard made what must have been a difficult decision: It bit the bullet, gave up its proprietary networking products, and embraced industry standards long before most vendors even knew what commitment to industry standards implied. We have nothing but admiration for HP's commitment to OSI and multi-vendor interconnectivity."
– The Yankee Group

This "connectability" provides you with one very important benefit. Vendor independence. The ability to connect to equipment you presently own, as well as to equipment you'll be buying in the future.

In addition to standard networking capabilities, HP AdvanceNet offers many functions not available from IBM and DEC. Functions such as StarLAN 1 and 10, a cost effective link for small companies

NEW PRODUCTS

Local-area networking hardware

International Communications Equipment Corp. has announced a 2.5M-byte Arcnet board for IBM Personal Computer, PC XT and AT, Personal System/2 and compatible systems.

Called **Icecard-I**, the product reportedly includes an extended memory module that allows up to four controllers to reside in one file server. According to the vendor, the card is compatible with Novell, Inc. networks and is priced at $189.

ICE, Suite E, 17945 Skypark Circle, Irvine, Calif. 92714. 714-660-0191.

Computer Systems & Technology, Inc. (CST) has introduced a peer-to-peer, 10M bit/sec. Ethernet personal computer local-area network.

Designated **RPTI-NET**, the product reportedly will link any combination of IBM Personal Computers, Personal System/2s and compatible machines to provide file sharing, print serving and message sending services. An Ethernet interface card and the Network Operating System are included.

RPTI-NET costs approximately $100 per node for hardware and software together (based on a six-node system).

CST, 226 E. Sherwood Ave., E. Farmingdale, N.Y. 11735. 516-420-1470.

ICS Electronics Corp. has introduced two plug-in cards that reportedly provide IEEE 488/GPIB/HP-IB bus control and interfacing capabilities for IBM's Personal Computers, Personal System/2s and compatible systems.

Designated the **488-PC1A** and the **488-PC2**, each card permits its host machine to operate either as a full-function IEEE bus controller or as a device on the 488 bus. The cards can be installed in any slot on the host personal computer's bus.

The 488-PC1A is priced at $395, and the 488-PC2 costs $345.

ICS, 2185 Old Oakland Road, San Jose, Calif. 95131. 408-432-9009.

Local-area networking software

Zylab Corp. has announced that its full-text search and retrieval product is now available to run in a local-area network environment.

The **Zyindex Server Version** reportedly provides complete text management capability for networks and can support up to 250 named users. The product is installed on a single server and allows the user to control access to sensitive files from within the program.

Zyindex Server Version costs $2,595.

Zylab, 3105-T N. Wilke Road, Arlington Heights, Ill. 60004. 312-632-1100.

Alloy Computer Products, Inc. is now shipping **NTNX/286 2.0**, the company's latest version of its proprietary operating software for the PC-Plus multiuser networking family.

The latest software was developed for Alloy's PC-Slave/16 and PC-Slave/286 boards, which offer ASCII terminal emulation and Netbios support, respectively.

NTNX/286 2.0 costs $795. Upgrades are available for $195.

Alloy, 100 Pennsylvania Ave., Framingham, Mass. 01701. 617-875-6100.

Network management

A mapping tool for network design professionals has been introduced by **Connections Telecommunications, Inc.**

Mapconnect reportedly will allow designers to create a visual representation of their wide-area network. The serving office, hubbing point and site icons, with their associated connectivity, are then superimposed over a U.S. map.

According to the vendor, the personal computer-based product supports high-resolution graphics screens and Microsoft Corp.'s Windows. It is priced at $2,000 per copy. An annual $400 maintenance fee is required after the first year.

Connections Telecommunications, 15 Christy's Drive, Brockton, Mass. 02401. 508-584-8885.

Stratacom, Inc. has announced the **IPX 12 Fastpacket Bandwidth Management System.**

According to the company, the IPX 12 is for use at digital network locations requiring one or two trunks. Features incude voice activity detection, data frame multiplexing and rerouting capabilities. The single shelf system is available in both tabletop and rack-mount configurations and is priced at $6,120.

Stratacom, 3175 Winchester Blvd., Campbell, Calif. 95008. 408-370-2333.

An interpreter software package designed specifically for decoding the Department of Defense Transmission Control Protocol/Internet Protocol (TCP/IP) has been announced by **Hewlett-Packard Co.**

The **HP 18221A TCP/IP** protocol interpreter will allow local-area network managers to analyze the network's protocol operation by capturing and displaying data in a decoded format for troubleshooting and network tuning. According to the company, the software program is designed to be used with the HP 4947A LAN protocol analyzer and is priced at

Continued on page 70

or departments using PCs. And OpenView, a network management system which easily incorporates multiple vendors' networking products into a Windowing function.

All of which puts HP in the right position to help make your company more competitive. Not only with the links to make your entire computer system, from mainframes to desktop PCs function as one, but with the support and service to keep it functioning.

In fact, HP will shoulder responsibility for planning, operating and troubleshooting your entire multi-vendor network, even the components which aren't ours.

For more information on HP AdvanceNet, call **1-800-752-0900, Ext. 282F.**

HEWLETT PACKARD

Continued from page 69

$950. The HP 4947A is available at $17,350, with delivery estimated at four weeks after receipt of order.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304. 800-752-0900.

Links

Netlink, Inc. has announced **Xtendlink**, a software package that is said to allow IBM Personal Computers to communicate over asynchronous links using standard Systems Network Architecture (SNA) software packages.

Xtendlink works with Netlink's SNA Hub communications processor and permits PCs to communicate over inexpensive asynchronous connections, such as an asynchronous 300 bit/sec. modem or packet-switched link. According to the vendor, the program still uses popular PC software packages that are SNA-based protocols, such as 3270 and LU6.2. The product, including the SNA Hub, is priced at $26,000 for a 14-line configuration.

Netlink, 3214 Spring Forest Road, Raleigh, N.C. 27604. 919-878-8612.

Frontier Technologies Corp. has announced a communications controller designed to provide Apple Computer, Inc. Macintosh II connectivity for X.25 and Defense Data Networks.

The **Adcom2-1 Intelligent Advanced Communication Controller** is based on the Nubus architecture, the vendor said, and includes 512K bytes of random-access memory and 64K bytes of read-only memory. The product utilizes a real-time, multitasking operating system and is priced at $1,495.

Frontier, 3510 N. Oakland Ave., Milwaukee, Wisc. 53211. 414-964-8689.

Paracom, Inc. has announced a bus bridge for linking Digital Equipment Corp.'s Q-bus-based computer systems to the external parallel processing structure of 32-bit Transputer products.

The **BBK-Q** board reportedly adheres to DEC's DR11-W parallel interface standard, and a VAX/VMS V5.0-compatible device driver is shipped with each unit.

The BBK-Q costs $2,995, and quantity discounts are available.

Paracom, Unit 60, Bldg. 9, 245 W. Roosevelt Road, W. Chicago, Ill. 60185. 312-293-9500.

Modems/Multiplexers

Toshiba America's Information Systems Division has unveiled a line of optional internal modems for use with the company's portable personal computers.

The Hayes Microcomputer Products, Inc.-compatible modems feature a 2,400 bit/sec. transmission speed. The **T2400A** and **T2400B** are both priced at $399, and the vendor will continue to offer its 1,200 bit/sec. modem for the T1000 PC at a reduced price of $299.

Toshiba America, Information Systems Division, 9740 Irvine Blvd., Irvine, Calif. 92718. 800-457-7777.

VXM Technologies, Inc. has announced that its **TIM** session layer software program for Transmission Control Protocol/Internet Protocol (TCP/IP) is available for Apple Computer, Inc. Macintosh computers.

TIM provides users with a uniform TCP/IP session layer that extends from MS-DOS to Macintosh to Unix workstations, as well as to Digital Equipment Corp. VAXs and IBM VM mainframe processors. The program is written in C and is priced at $365 for the Macintosh. TIM for mainframes is priced from $4,500 to $24,500, depending on CPU.

An IBM/MVS version is scheduled to be released in June.

VXM Technologies, Box 9121, Kenmore Station, Boston, Mass. 02215. 800-627-5221.

Everex Systems, Inc. has announced that it is shipping **Efax 2.0**, a memory-resident version of the software that is included with the Everfax EF-12/48 facsimile modem.

The Everfax external modem is for IBM Personal Computers, Personal System/2s and compatibles. Computer documents can be sent directly to Group III facsimile machines, which also receive faxes and automatically store them on disk, the vendor said. The software occupies less than 100K bytes of memory and was designed to pop up over on-screen applications whenever a fax is sent or received.

The Everfax comes standard with Efax 2.0 software and costs $495.

Everex, 48431 Milmont Drive, Fremont, Calif. 94538. 415-498-111.

Customer-premises equipment

Commtex, Inc. has extended the port capacity for its **Cx-80 Data Exchange** from 45 to 50 ports. The company also announced the **Deca Line Port Adapter** (DLPA), designed to increase port speeds from 19.2K bit/sec. to 38.4K bit/sec.

The Cx-80 is a multifunctional data communications device that emulates IBM 3174 controllers and contains an integral data Public Branch Exchange system, the vendor said. It supports both asynchronous and Type-A coaxial terminals and personal computers.

The DLPA is part of the standard Cx-80 Data Exchange configuration, and end-user pricing ranges from $4,950 to $13,950.

Commtex, 1655 Crofton Blvd., Crofton, Md. 21114. 301-721-3666.

How UDS squeezes more out of the V.32 standard

Believe it! In the hands of UDS engineers, the V.32 standard means a lot more than 9600 bps, full-duplex.

Every UDS V.32 is fully compliant with the CCITT recommendation, but that's only the beginning. Model V.3225, the latest in the UDS V.32 family, offers *lots* of extra features.

First of all, there's MNP level 5, the data compression/error control technique that increases data throughput by as much as a 2:1 ratio. In other words, a UDS V.3225 can give you full-duplex error-free communication at 19.2 kbps!

When your dedicated line goes down, V.3225 is the ideal dial back-up solution. It even checks the dead line periodically and switches back to it as soon as it's available.

Then there's V.22 *bis* operation; if your V.3225 receives a call at 2400 bps, it automatically drops to that speed, and full-duplex communication goes on.

Got a real data density problem? The card you get in your free-standing V.3225 can be plugged directly into the Universal Data Shelf,™ giving you as many as 16 channels in a standard 19- or 23-inch equipment rack.

To learn how the V.3225 can squeeze more from your datacomm system, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; FAX 205/830-5657.

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PRODUCT SPOTLIGHT

PERFORMANCE MANAGEMENT TOOLS

FRAN O'NEIL

Extending the life span of vital systems

BY SHERYL KAY

The Japanese don't think they need performance management products. And maybe they don't, but the avoidance of these products is one characteristic that U.S. companies should probably not try to emulate.

H. Pat Artis, former president of the Computer Measurement Group and now a systems performance consultant, recently toured Japan; according to him, only 5% of the large information systems organizations there actually collected performance measurement data on an ongoing basis.

It is Artis' theory that the Japanese do not feel the need to watch system performance closely because the country is riding high on a wave of industrial prosperity. "They've been having a real industrial surge," he says, "and they figure, 'If we need more power, we will just go out and buy it.' "

That logic might have once worked in this country. But today, as most U.S. information systems managers know only too well, the boom days are over. The mandate for now and the foreseeable future is maximizing productivity from existing systems and spending wisely when the time comes to invest in new systems.

It is true that many data centers are still operating on instinct and nonautomated observation in their management of systems, but their numbers are shrinking.

Already a significant number of organizations are buying into automated performance monitoring and management products that will help them maximize the return on systems investments. This trend is expected to become more pronounced during the next few years. Input, a market research firm in Mountain View, Calif., estimates that revenue for producers of data center control software, which includes a variety of performance management tools,

INSIDE

Expert Assistance
Performance management products now lean heavily on artificial intelligence.
Page 76.

Loaves and fishes
DB2 applications are multiplying faster than tools to tune the environment. Page 80.

Kay is a Tampa, Fla.-based free-lance writer.

Tools

CONTINUED FROM PAGE 71

increased by $500 million from 1987 to 1988 and will reach $3.6 billion by 1990.

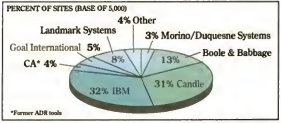
This surge in the popularity of performance management products is not really surprising when you consider what organizations are spending on information systems, says Leonard Eckhaus, president of the Association for Computer Operations Management (AFCOM), headquartered in Orange, Calif.

"Because costs of computer equipment and software are such a high percentage of gross operating costs for major corporations today, these expenses need to be justified," he says. "When you stop to consider that computer systems today cost well over $1,000 per hour to operate, it is clear that wasted time or a slowed-down system cannot be tolerated. These systems have to be monitored and fine-tuned."

If systems are running slowly and information systems management has no method of determining where the problems might be, it is often easier to look for quick solutions through purchasing additional technology, says Doug Shelton, a technical support analyst at Puritan-Bennett Corp., a medical equipment manufacturer in Overland Park, Kan. But, he adds, there is a major flaw in that approach: "You wind up throwing money at a problem instead of finding out what the nature of the problem is."

Performers in performance

Market share of IBM and plug-compatible mainframe-based performance measurement and monitoring tools in July 1988



SOURCE: COMPUTER INTELLIGENCE
CW CHART: DOREEN DAHLE

In order to avoid squandering Puritan-Bennett's money in this fashion, Shelton is currently using OPT-3000 and Trend from Hewlett-Packard Co. to monitor and manage several applications running on an HP 3000, including the company's primary order-entry system.

The OPT software package provides ongoing systems status monitoring. OPT features instantaneous data views, allowing operators to get an immediate readout on a malfunctioning area.

For long-term data views, Puritan-Bennett uses Trend, a built-in capacity-planning system in the firm's HP 3000. Trend collects data on the ebb and flow of CPU usage. This information is sent to HP every three months for compilation and analysis, and the results are returned to Puritan-Bennett, which uses them for planning purposes.

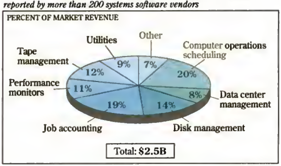
"The order-entry system gets spikes several times during the day," Shelton notes. "These tools help us see the usage patterns and make adjustments so we won't have to upgrade to a faster CPU."

Howard Miller, assistant vice-president of university information systems at Boston University, credits Software AG of North America, Inc.'s Review with helping his department fend off an expensive hardware upgrade by isolating inefficiencies in system utilization.

Using information provided by Review, which is sold as a resource consumption monitor for Software AG's Com-plete communications package, Miller says that his staff was able to reduce by 40% the resource consumption of a major financial system running on the university's IBM 3090-200.

Time and money

Scheduling and job accounting are the two most popular categories of data center management software, according to revenue figures reported by more than 200 systems software vendors



SOURCE: INPUT
CW CHART: DOREEN DAHLE

"This was a major financial system, which represents close to one-third of our overall processing," Miller says, "so a 40% gain is significant." The reduction meant that the university could extend the life of its machine and avoid adding people to manage larger equipment.

At any rate, hiring new people is not an easy thing to do these days, observes George Kurtz, a data center automation consultant who operates under the company name Comtech, Inc. in Libertyville, Ill. "Skilled people are hard to come by these days, so even if you wanted to hire more people to man your systems, chances are that you wouldn't be able to," he says.

Furthermore, Kurtz adds, if a data center is not already using its computer resources efficiently, adding a bigger machine will probably only cause more problems.

Of course, there are situations in which a purchase or an upgrade is called for, and performance management tools can also play a major role in helping an organization figure out exactly what it is likely to need where and when. Without these kinds of tools, says Donald Ouellet, a specialist in data center operations at the consulting firm DMR Group, Inc., a data center manager may end up having to rely solely on vendor information to determine future hardware and software requirements.

When that happens, he says, "You have totally lost control over what you are buying and, in essence, have closed the door on all of your other options."

Terry Miller, director of information systems at Fel-Pro, Inc. in Skokie, Ill., says he has found performance monitors an invaluable aid in capacity planning. "Once we have our system tuned, we feel our capacity planning projections are solid as well," Miller notes. "If you've got systems that are running away and hogging the system, it's really difficult to do capacity planning because you don't know what you really have, let alone what you will need later."

Fel-Pro, an automotive parts maker that has an IBM 4381 mainframe running in an MVS environment, uses Goal Systems International, Inc.'s Explore monitor for on-line tuning of IBM's CICS.

Both Fel-Pro and its information systems budget have grown every year during the eight years Miller has been with the company, he says. But, he adds, when taken as a percentage of total sales, the information systems budget has actually either stayed the same during that period or gone down. That achievement is largely attributable to Explore and other performance management products that preceded it, he says.

Capacity planning is really a matter of finding a true center. Miller says, "You don't want to be over on one edge where you have too much capacity, or on the other edge where you don't have enough — and performance monitoring can serve as a compass."

Although he is now the president of I/S Management Strategies, Ltd., a consulting firm in Whitefish Bay, Wis., Alan Sherkow remembers what it is like to try and steer between those extremes.

Up until last year, Sherkow was a capacity planning specialist at First Wisconsin National Bank of Milwaukee. While there, he worked extensively with several monitoring, management and analysis products from Morino, Inc. — the MICS base set and modules including MVS Performance Management, Accounting and Chargeback — to collect and summarize measurements from SMF, RMF and TSO. Adjunct products from that company were used for analysis of CICS and DB2 performance.

Always on budget

"Every week we reviewed MICS reports in depth — what was done that week and what resources it took to accomplish those tasks," Sherkow notes. This information was then tracked statistically to determine future systems requirements. Variances from forecasts to actual requirements were minimal, Sherkow says: "I can never remember going over budget."

But saving money by avoiding unnecessary or premature purchases is only one aspect of the productivity-enhancement task and only one of the reasons that information systems managers are using performance management products.

"It's more than just belt-tightening," Boston University's Miller says. "Computer centers today are competing with other methods of computing such as departmental computing, and in fact, the biggest obstacle that we have to the growth of computer centers is the quality of our service."

Without performance monitoring and management products, data center managers are often unable to foresee and ward off service problems such as response time degradations or report delays. "These managers don't have any data that says 'You're at 10,000 feet,' " Artis says. "They just have trees scraping the bottom of the plane."

Kurtz refers to this kind of unguided operation as "management by noise level, rather than by numbers." Such management methods would not work for a corporation, he says: "No corporation could run without a profit and loss statement or a balance sheet." And, as accountability to users and to the bottom line become

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ESA/370: Help or hurdle?

At least one consultant, Paul Nugent, technical services manager in the management consulting department at Touche Ross & Co. in Houston, says he believes that performance management products will become even more popular in the IBM world as a result of the advent of that firm's Enterprise Systems Architecture (ESA)/370 operating system.

ESA/370, announced in March 1988, makes available an additional 16 terabytes of virtual memory, a boon to many large shops in which systems such as IBM's CICS and IMS require huge amounts of virtual memory. ESA's virtual memory expansion now makes it possible to create large DB2 buffer pools inside the processor, conceivably eliminating time-consuming I/O operations by moving major segments of a database inside the processor before data is accessed.

The question is whether all these new services will help or hinder overall system performance and, by extension, strengthen or weaken the market for performance management products in this sector. Nugent says he would bet on a rising need for performance management.

While ESA improves system performance by unclogging I/O bottlenecks, he says, it also adversely affects CPU resources. Performance management tools allow IS to find ways around resource drain and avoid "robbing Peter to pay Paul."

Performance measurement products, Nugent says, will be very much needed to control, measure and contain the ESA environment.

"Yes, I may get great I/O performance from putting all of a large DB2 database into memory," Nugent says, "but that doesn't mean I'm ready to buy another $4 million computer to support it."

SHERYL KAY

more important, it is becoming clear that these methods do not work very well for data centers, either.

For one thing, as Fel-Pro's Miller points out, service expectations are now much higher than they used to be. One of the service commitments made by the information systems organization at his firm is subsecond response time, he says, and lapses do not go unnoticed. "When our response times go over an average of a second, we get phone calls."

Those calls are justified, Miller adds, because quick systems response is imperative if the firm is to provide its customers with products "on time, all the time."

If fast access to data is critical in terms of servicing customers in the abstract, it is even more so when there is a direct interface between a company's information systems and its customers.

"Let's say you've got an on-line order processing system that's bogged way down," Puritan-Bennett's Shelton says. "Your customer has better things to do than to hang on to the telephone waiting for you to process his order."

Not a cure-all

While there are good reasons for using performance management products, they are not cure-alls and they are not perfect.

One major shortcoming is that many of today's performance management products are dedicated to only one working environment. This means that, in addition to reconciling different sets of performance information for various types of systems under their control, information systems managers may also have to contend with explaining to corporate executives why they need to buy multiple monitoring systems to save time and money.

Miller says he knows the feeling. Online processing at Boston University is accomplished via CICS and Com-plete. In order to measure resource consumption for both systems, Miller has had to install two different monitors that are functionally almost identical — Omegamon for CICS from Candle Corp. is used to locate trouble spots and analyze service levels and resource availability in that environment, while Review handles Com-plete.

"The ideal package," Miller says, "would be capable of providing on-line and batch facilities across multioperational environments."

Multifunctionality is also an important issue because the price tags for these products can be fairly impressive.

"You start with a $50,000 investment," Artis says, "and by the time you add the personnel costs and anything else, you're looking at $100,000."

Personnel costs must often be calculated as part of the price of these tools because many of these packages require a skilled interpreter to make sense out of the raw performance data they generate.

"We need more interpretation guidelines," Shelton notes, "so there is an analysis of data for someone who needs to be educated in performance basics."

Furthermore, Kurtz claims, most performance monitors are developed in systems laboratories: "They're not always designed with business issues in mind." In many instances, he says, the emphasis is on CPU or channel rates rather than service-level monitoring.

Used in isolation, not even the best performance management products can be counted on to produce a real-world business perspective. Even products that have incorporated artificial intelligence for diagnostic and problem-solving purposes must be manually adjusted to account for each company's circumstances.

Simply taking the data provided by such systems as a guide for action makes no sense, DMR's Ouellet claims. Instead, he recommends that organizations intending to use these products for planning purposes also collect some pertinent information about the organization and its operating environment that can be used as a reality check. "These tools are mandatory for planning," he says, "but you need the whole picture."

Having a fix on the big picture can also serve as a safeguard for information systems managers against misuse of performance management tools by technology junkies on their own staff. It is no reflection on the performance management products to recognize that they, like a company's books, can be manipulated, AFCOM's Eckhaus says. These tools can be used to mislead rather than enlighten or to justify unnecessary purchases rather than forestall them. "Figures don't lie, but liars can figure," he notes, "and someone can select the areas to measure so that the figures show what they want them to show." •

A continuous investment

Like all good managers, successful performance management tools eventually reduce reliance on their direct intervention and narrow the scope of their day-to-day involvement in an operation.

One way this sometimes occurs is that performance management tools actually improve the diagnostic skills of their users through guided feedback to a point at which they can form their own educated guesses about many systems problems.

Doug Shelton at Puritan-Bennett provides a good example of this phenomenon.

After three years of working with OPT 3000, a system status monitoring package that provides instantaneous data views, Shelton says that he and his staff have begun to anticipate many of the problems that they once needed the Hewlett-Packard Co. product to find. "We still use OPT," he says, "but we use it smarter now."

Puritan's Shelton

Having gained a better feel for the system through the information that the product provided, Shelton can now reserve it for more specialized problems or as a means of confirming a diagnosis. "Now I usually know what's wrong, having previously used the product for the same problem," he says.

Another reason that performance management tools may be called on less frequently as time goes by is that, if the tools are doing their job well, major systems problems should become less common. The longer you use a tool of this kind, says consultant H. Pat Artis, the less likely you are to have significant, unaddressed problems "like applications that weren't designed properly, or operational procedures that aren't working or an I/O configuration that isn't wired properly." Usually, he says, once a technician corrects a problem, he can prevent its occurence in the future.

When an organization reaches that stage, it may be tempted to think it no longer needs the performance management products that got it there. But that kind of thinking is shortsighted, according to Artis. Instead, he says, the point at which these tools bring stability to the operations area is the point when a company should consider extending the performance enhancement process into the application development phase.

There are, Artis notes, a variety of tools now on the market for this purpose, including conventional performance management software products, performance engineering packages, such as the Crystal family of products from BGS Systems, Inc. in Waltham, Mass., and Scert II from Performance Systems, Inc. in Rockville, Md. The latter are application development tools and high-end database products that include mechanisms for projecting performance.

Using products like these to tune applications for maximum performance as they are being developed represents a major step for productivity, Artis contends. "It is time we changed from pathologists to general practitioners," he says. "Right now, we only look at dead applications and try to figure out what killed them. The real benefits are in preventive development."

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Intellect becomes a factor

BY STAN KOLODZIEJ

Expert systems have something extra to offer information systems departments that are using systems-monitoring tools to squeeze the most performance from existing operating systems. That something is the ability to see and act on problems very quickly.

The technology of expert systems was not always so helpful. Just a few years ago, most expert systems were written for stand-alone systems from companies such as Sun Microsystems, Inc. and Apollo Computer, Inc. and did not have any way of getting knowledge from the world around them. The only way these isolated systems could be used for performance management was if a human were deputized to fetch and carry, says Earl Hodil, director of technical support at MVS Software, Inc. in Los Angeles. "The operator would have to be the conduit between the expert system and [IBM's] MVS operating system, often hand-carrying the systems data to the expert system."

Those were the old days, however. Now there are numerous interfaces between performance monitors and expert systems and, in some instances, even bundled combinations of the two. MVS Software's Expert System Interface, for example, provides an operative link to IBM's Expert System Environment and Knowledgetool expert systems tools, while Boole & Babbage, Inc.'s DASD Advisor is built on Aion Corp.'s expert systems shell.

Such linkages, Hodil says, open up new performance-tuning opportunities. "For one thing, expert systems give operators flexibility to reconfigure the order and priority of jobs," Hodil explains. "And sometimes the [expert] system will even make that decision for them."

Chris Brown, a systems programmer at Mack Trucks, Inc. in Allentown, Pa., says he saw a vast improvement in job scheduling on his IBM Systems Network Architecture network using the rules-based system contained in Automate/MVS, a monitoring package from Duquesne Systems, Inc. in Pittsburgh.

Previous to Automate/MVS, Brown was using Time-Sharing Subsystems Option (TSSO), a public domain package.

"With TSSO, we had to wait for things to happen in a certain order," Brown explains, "and you couldn't alternate that order. It was frustrating."

In contrast, Brown says he can now issue a command from a console, schedule a command list for execution, send a message and program these and other actions to take place at a particular time of day or at specific time intervals.

"There is hardly any syntax [with Automate/MVS] to contend with, and instructions are dynamically loaded," he adds. "With TSSO, we had to assemble and load every module."

With speed

For Doug Swords, technical support manager at Pitt Memorial Hospital in Greenville, N.C., the expert system part of Boole & Babbage's DASD Advisor means getting data a little faster through the IBM 3090 mainframe to crucial hospital applications.

"We got our I/O response time down to below 25 msec, better than the industry average of 30 msec," Swords explains. "The monitor can tell you what's wrong with the system. For example, if volume ABC is experiencing significant queuing response-time delays, DASD Advisor uses English-language statements to give you options, such as redirecting data to another queue." With DASD Advisor, Swords claims he can take recent graduates and have them do significant job-tuning with the monitor.

Before DASD Advisor, Swords says he spent three to seven hours a week reviewing DASD performance. "Now I've given DASD tuning over to an operator, while I can concentrate on bigger projects in the hospital," he claims. He had previously installed Boole & Babbage's Response Monitor, which lacked an expert system. "I remember a lot of paperwork, but not much fine-tuning," Swords says.

There is no question that there is a trend here, but it is one that is still spotty in some important places.

IBM, for example, has basically abandoned the MVS and VM software performance monitoring market to third-party vendors, such as Boole & Babbage and Candle Corp., and does not seem to have reversed its course with expert systems.

Some years ago, IBM undertook Yes/MVS, a project aimed at producing expert systems technology that would increase MVS monitoring and performance. Yes/MVS produced little, but it did lead to Knowledgetool, IBM's generic expert systems software package, which ironically enough, the company has never sold directly as a tool to increase MVS or VM output. Instead, IBM seems to have targeted Knowledgetool at Netview, its strategic network management system, and left the door open for others to use Knowledgetool to boost their own performance-monitoring systems.

The third parties are doing just that, as well as stepping in to fill another notable gap left by Candle's Omegamon, which,

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Kolodziej is a senior editor for *Computerworld Focus on Integration.*

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by most estimates, owns anywhere from 75% to 85% of the MVS performance monitoring market and lacks a specific expert systems component to its performance monitoring system. Candle might have the last laugh, though, since many PM vendors are providing their own expert systems interfaces to Omegamon.

Performance monitors for Digital Equipment Corp. VAX/VMS systems have been slow to appear, but, in that instance, the pace is in keeping with market demand. Unlike the IBM MVS environment, which stresses high-powered mainframes and numerous, centralized direct-access storage device functions, the VAX arena has traditionally been weighted toward departmental machines carrying smaller processing loads. (For further discussion of developments in performance monitors for DEC systems, see story page 78.)

Boundaries and definitions also tend to be a bit vague when you start looking at the area in which expert systems and performance monitoring meet.

Pitt's Swords

For Robert Desautels, an analyst at International Data Corp., a Framingham, Mass., market research firm, an expert system is simply a program that looks at data and takes some sort of action based on certain user- or vendor-defined rules. But that definition still leaves plenty of room for disagreement, and one firm's expert system enhancement may be another's rule-based adviser.

For example, Minneapolis-based Blueline Software, Inc. says that its Vital Signs performance monitoring system makes decisions based on data it receives, but the company does not classify it as an expert system, because it feels the definition of an expert system is not yet clear enough within the computer industry. Stating otherwise, the company maintains, would amount to marketing hype.

At the same time, another vendor with a similar product — Allen Systems Group, Inc. in Naples, Fla., the producer of an MVS monitoring system called Prealert — has no qualms about calling its own rules-based product an expert system. Prealert "has the ability to take user-defined performance thresholds and definitions and act on them," says Ron Yon, a developer responsible for Prealert. "That's what expert systems can do."

The best course of action, Desautels says, is to forget definitions and "look instead at what the system can do."

Don Tardiff, MVS systems programmer at Williams International, a turbine engine manufacturer in Walled Lake, Mich., says he likes what Allen Systems' Prealert/MVS and its rules-based or expert systems component called Exception Analysis can do. It can, he says, compare real-time MVS performance with user-defined exception thresholds. If a performance threshold is exceeded, the system displays an exception message and can issue an MVS command if necessary.

Equally important, instead of simply describing the general effect of a problem, such as excess CPU usage or poor response time, Tardiff says, Exception Analysis can dig deeper and pinpoint the problem's cause. This lets you know, for instance, that Job AE 3964 is consuming 80% of the CPU. That kind of intelligence, he claims, can save valuable time.

Exception Analysis is an enabler in many ways, Tardiff says: "It enables us to define [MVS] performance criteria [and] define reports that [allow] us to identify and correct those problems in a system."

For Tardiff, another advantage of Prealert is its ability to handle both MVS and Cullinet Software, Inc.'s IDMS database system.

"Prealert/MVS handles CPU and DASD utilization while monitoring the IDMS database," Tardiff explains. "With most IDMS monitors, it's like catch-22: You have to log in to IDMS first to invoke the [performance] monitor, but it also means IDMS has to be running well in order to log on."

Although they appreciate what expert systems technology has done for performance monitoring, users are quick to say that there is room for improvement.

Some complain that many such expert systems are still "hard-coded," preventing users from going in and programming their own parameters into the expert systems knowledge bases.

In the future

Al Beer, a customer support engineer at Interlink Computer Sciences in Fremont, Calif., says he thinks tomorrow's expert systems should offer more direct interplay with operators. "I want the expert system to ask users directly, 'Do you really want to schedule that now?' " Beer says. "The next step is the intelligent scheduling of user requests."

Tardiff says he believes that expert systems should be able to capture and monitor more data at the PC level. Vendors say that stage is coming, and they are looking at interfacing with network management systems such as IBM's Netview and Cincom Systems, Inc.'s Netmaster to penetrate more to the PC and PC local-area network levels.

It is understandable, MVS' Hodil says, that the cobbler's children should be exacting about their first and long-delayed pair of shoes, but he adds, "You have to remember that this entire field of systems performance monitoring is still a relatively new concept. Computers have traditionally been used to monitor other machines but not other computers." •

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DEC third parties benefit as self-help fades with users

BY STAN KOLODZIEJ

Until recently, performance monitoring tools were not a critical issue in the Digital Equipment Corp. VMS environment. I/O and direct-access storage device requirements for VMS running on DEC VAX departmental minicomputers were so manageable that users either handled performance monitoring and fine-tuning on their own or relied on software tools provided by DEC.

The third-party market for VMS performance monitoring, therefore, was not nearly as robust as that of the IBM MVS market. But that situation seems to be changing. DEC has been aggressively introducing higher capacity VAX computers and operating system upgrades that enhance larger, clustered (and more expensive) VAX configurations. Because these configurations put extra performance pressures on the operating system, DEC has also introduced fine-tuning tools such as VAX Performance Advisor and Autogen to help with the load.

But not all customers want to upgrade their systems, especially since DEC recently started pegging software prices to the capacity of VAX CPUs. This means that when customers upgrade to a higher performance VAX machine, they pay correspondingly higher prices for the operating system and applications software.

Rather than face this extra expense, users will decide to try to get more from their existing DEC systems.

Certainly, some will use DEC software monitoring and management tools for this purpose. But not all customers have the time or resources to do the programming required to reconcile the interfaces and command syntaxes found among older tools such as VAX/VMA Accounting, Sysman, Authorize and Monitor.

As a result, room is opening up for a growth market in third-party VAX/VMS performance monitoring tools.

Many DEC customers are doing what Wren Hunt did. The systems analyst at Morrison Molded Fiber Glass Co. in Bristol, Va., uses Rabbit-9, a VMS performance monitoring system from Raxco, Inc., to fine-tune VMS running on the company's VAX-11/780 minicomputer.

Hunt claims that Rabbit-9's expert systems capability has boosted VMS performance by 15% to 25%.

According to Hunt, Rabbit-9 has built-in heuristic capabilities that can interpret and incorporate user patterns into ongoing monitoring and performance tasks.

Hunt has looked at DEC's performance monitoring tools such as Performance Advisor, but he says many of the tools can be cost-justified only in clustered VAX installations. With only one VAX and 25 users, Hunt says he will stay with less expensive tools such as Rabbit-9.

The Medical College of Pennsylvania in Philadelphia is another VAX user that turned to a third-party software provider for performance management assistance. The medical college has been using a product called Dynamic Load Balancer from Touch Technologies, Inc. in San Diego to increase the response time of DEC's Datatrieve reporting language and various statistical analysis programs.

Tom Skipper, systems manager, says Datatrieve is a CPU-intensive product that was capable of bringing the college's VAX-11/750 to its knees when as few as four users were using Datatrieve. Dynamic Load Balancer, Skipper adds, has helped cut I/O throughput and response times automatically, without his having to touch the system.

Skipper adds that he looked at the VMS performance tools DEC was offering, but they concentrated mostly on the monitoring part. Using them to adjust the system load parameters would have required some programming on his part.

In contrast, Skipper says, the Dynamic Load Balancer both monitors and adjusts the system load automatically, without operator intervention. •

ASK THE VENDOR

We are running Allen Systems' Prealert under MVS/XA. Is it possible to monitor a single task from Cullinet's IDMS as it is actually executing each instruction? If not, are there any plans for this capability?

Jerry Earles
Database Administrator
Bassett Furniture Industries
Basset, Va.

ALLEN SYSTEMS GROUP, INC.: At this time, it is not possible to monitor tasks, instruction by instruction, within IDMS. Prealert software resides in its own address space and uses cross-memory services to view data contained in IDMS control blocks within the IDMS address space. To monitor tasks as they are executed, Prealert would have to reside within the IDMS address space.

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When DB2 is out of tune, MVS performance suffers

BY C. WILLIAM CHEN

Performance monitoring and management is especially critical in a multiuser system in which shared resources must be optimized to achieve maximum throughput.

With a multiuser operating system such as IBM's MVS, assigning different levels of dispatch priorities to the subtasks — such as IBM's TSO, CICS and DB2 — is one way to enhance throughput. Each of the MVS subtasks is also a multiuser system in itself. Therefore, the subtask further divides its allocated resources from MVS to the applications running within its domain.

For example, when a DB2 application program requests a set of records, DB2 processes the request first and then asks MVS for the necessary resources to accomplish its task. The speed with which the transaction can be accomplished depends on how fast DB2 can process the request and the availability of resources from MVS.

As more and more applications are developed using DB2, tuning the DB2 subsystem becomes just as critical as tuning MVS.

The supply of monitoring tools for DB2 is currently limited. Those that are available from a few independent software vendors can, however, ease the tedious task of capturing data and assist in performance monitoring and tuning. These products generally fall into two groups. One deals with access strategies and the other with DB2 subsystem resource usage.

DB Optimizer from DB View, Inc. and Crystal from BGS Systems, Inc. fall into the first category. Both products analyze and recommend changes to SQL statements for optimized access strategy and can help users understand the impact of SQL statements before they are put into production.

The second group of products monitor DB2 resources such as threads, buffers, opens, closes, locks, contentions, rollbacks and commits. IBM's DB2PM produces batch reports and does not have any on-line capability. Insight/DB2 from Database Utility Group, Inc. is an on-line performance monitor that helps users monitor DB2 resources and spot bottlenecks. The interface it uses is IBM's TSO/ISPF.

Essential characteristics

There are a number of features that are absolutely critical in DB2 monitoring tools. The first step is to capture the necessary data. An important feature of data capture is the ability to view the data online within seconds after it is captured, an essential feature for any on-line monitoring software product.

Furthermore, the data should be capable of being piped to any device, such as a screen, printer or file, and saved if needed so that the user can view it, print it and then process the data in the future.

The tool for capturing data should be as painless to use as possible and should also be as automatic as possible. It should not be the traditional avalanche of data printed in hexidecimal format, turning the performance analyst into an archaeologist digging and sifting through the data. The user should be able to turn on the monitor automatically at a preset time or by a trigger mechanism based on some preset values or key parameters.

Because many companies have their data centers separated geographically, a remote monitoring capability is certainly a big plus.

However, automatically turning a monitor on is still a rare feature, although remote monitoring is available on Insight/DB2.

In addition, the monitoring software package that is used should be capable of maintaining history files and be ready for statistical analysis software programs such as SAS Institute, Inc.'s SAS. There is also merit in storing performance records in relational tables so that you can use SQL to retrieve and manipulate those records. However, there is one drawback to this approach. The performance monitoring software can drastically affect the system it is monitoring by creating additional records.

While analyzing performance data in batch mode allows the user to see trends and exceptions, the tool must also have an on-line feature that can capture the data, summarize it and then display it in some type of graphical panel to provide a bird's eye view for spotting bottlenecks. A zoom-in capability that allows you to selectively see more details as needed should also be provided.

To enhance the ergonomics, it is helpful if the product can integrate numbers and graphics on the display panel so that the various components and their respective activities can be seen, similar to the schematic model of a chemical plant. However, this feature has not been exploited by any products to date. ●

Chen is a DB2 systems administrator at Mervyn's department store chain in Hayward, Calif.

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Performance monitoring software

COMPANY	PRODUCT NAME	OPERATING SYSTEM	ENVIRONMENT BEING MEASURED	HARDWARE PLATFORM	MAJOR FUNCTIONS	INCUDES REPORT GENERATOR	TYPES OF REPORTS PRODUCED	PROVIDES GRAPHICS ANALYSIS OF DATA	PERFORMS ON-LINE, REAL-TIME REPORTING	PERFORMS DATA ARCHIVING	INCLUDES WHAT KINDS OF CAPACITY PLANNING AIDS	INCLUDES MODELING FEATURES	INTERFACES TO WHAT OTHER SOFTWARE	PRICE
Adesse Corp. **(800) 338-1568**	VM/SP Performance Analysis Capacity Evaluations Subsystem	VM	Interactive response time	All IBM 370 architecture systems	Analyzes VM performance; tests system, applications, stress, generates work loads on VM systems	Yes	Activity	No	Yes	No	Work load generator	Yes	All applications running under VM	$4,200 to $14,000
Aim Technology **(408) 748-8649**	Aim Multi-User Benchmark	Unix	System throughput, response time	All running Unix	Compares Unix performance as users are added, compares up to 20 systems	Yes	Graphical, system response time	Yes	No	Yes	Compares current capabilities to other systems	No	None	$7.450
	Aim Job Accounting	Unix	Login time, CPU, disk usage	All running Unix	Tracks usage by user and group, maintains resource chargeback, history	Yes	Detail, summary	No	Yes	Yes	Historical usage information, predicts future needs by group	No	None	$1,350 to $9.900
	Aim Job Scheduler	Unix	CPU usage	All running Unix	Predicts job start and complete time, balances system workload, maintains system response	Yes	Detail, summary, historical status	No	Yes	Yes	Historical information on CPU usage	No	None	$1,100 to $7,900
	Aim Disk Tuner	Unix System V	Disk file system	All running Unix System V	Monitors disk activity, reports by file system, improves project performance, defragments file system	Yes	Detail, summary, histograms	Yes	Yes	No	Detailed analysis of disk usage by file and file system	No	None	$1,250 to $8,900
	Workstation Benchmark	Unix System V and 4.2, OS/2	Single-user multitasking	All running Unix System V, OS/2	Monitors response time, subsystem performance, multitasking ability, throughput	Yes	Multitasking response time, work throughput	Yes	Yes	No	Indicates maximum capacity of system	Yes	None	$4.750
Allen Systems Group, Inc. **(813) 263-6700**	Prealert MVS/IDMS	MVS/SP, MVS/XA	MVS and IDMS	IBM or plug compatibles	IDMS performance monitoring, IDMS/R and MVS exception analysis, MVS weight analysis, problem notification control system	No	None	Yes	Yes	Yes	CPU utilization, degradation, weight, multiple IDMS central version analysis	No	None	$11,700 to $25,900
Amdahl Corp. **(800) 233-9521**	Modeling and Analysis Package	MVS/SP, MVS/XA, VM/CMS	MVS	IBM 4300; 3080; 3090 series and compatibles	Establishes base line performance, predicts effect from a change in hardware or work load	Yes	Response time, throughputs, I/O subsystem measurements, CPU utilization	Yes	Yes	Yes	Projects performance after change. automates company change scenarios, builds in knowledge of hardware characteristics	Yes	IBM ISPF	$12,000
Automation Design, Inc. **(312) 670-2660**	Mort	MS-DOS	User response time	IBM PC, XT, AT and compatibles	Identify user response time problems	Yes	Statistical analysis	No	Yes	Yes	None	No	None	$1,100 to $25,000
Axios, Inc. **(516) 348-1900**	Fetch	MVS, MVS/SP, MVS/XA, ESA	CICS load time	IBM systems running MVS, MVS/SP, MVS/XA, ESA	Monitors CICS load time	No	None	No	Yes	Yes	Shows bottlenecks at load library	No	All software that is loaded via CICS	$12,000
	Fetch/XA	MVS, MVS/SP, MVS/XA, ESA	CICS load time	IBM systems running MVS, MVS/SP, MVS/XA, ESA	Monitors CICS load time	No	None	No	Yes	Yes	Shows bottlenecks at load library	No	All software that is loaded via CICS	$15,000
Bear Computer Systems, Inc. **(818) 508-1894**	E-MON VMS Ethernet Monitor	VMS	Continuous Ethernet network	DEC VAX	Monitors Ethernet traffic, tabulates nodes seen during session, simulates loads, tests communication between nodes	Yes	Traffic by node, filtered reports with summaries	Yes	Yes	Yes	Allows test loads to be aded to prove added capacity	No	None	$3.500
	I-MON VMS Image Monitor	VMS	Machine time consumption	DEC VAX	Monitors statistics about routine names, line numbers or scheduling states	Yes	Histograms and screen images	Yes	Yes	Yes	Logs I/O rates, Plans control of paging in a multiuser environment	No	All VMS image	$1,300 to $18,300
	S-MON System Services Monitor	VMS	User programs	DEC VAX	Calls to system services from user written programs	No	None	No	Yes	No	NP	No	All languages	$1.000 to $15,000
Benta **(816) 353-3765**	Utilog	MS-DOS, PC-DOS	System usage	IBM PC, XT, AT, PS/2 and compatibles	Monitors amount of time system is used	Yes	User, chronological logon and date	No	No	Yes	Provides user records	No	Dbase III	$189 to $295
	Reporter 1	MS-DOS, PC-DOS	Application programs	IBM PC, XT, AT, PS/2 and compatibles	Provides time, date and usage analysis for each application	Yes	Usage by user, date and machine number	No	No	Yes	Time, date and usage analysis for each application	No	Dbase III	$295
BGS Systems, Inc **(617) 891-0000**	The VM Applications Planner	VM/SP, VM/HPO	CMS application performance	All IBM 370 architecture machines	Monitors application use, I/O and CPU for perfomance tuning	Yes	Application detail, usage and user	Yes	Yes	No	None	No	None	$18,000 includes capture VM
BI Moyle Associates, Inc. **(612) 933-2885**	CICS System Status Display Program	DOS/VSE, MVS	CICS	All IBM mainframes	Provides on-line display of CICS performance variables	Yes	Summary	No	Yes	Yes	Report generator	No	None	$2,800 to $4,000
	BIM Montr	DOS/VSE	DOS/VSE	All IBM mainframes	Analyzes DOS/VSE page rate, CPU utilization, current system status	No	None	No	Yes	No	Report generator	No	None	$1,200
Blueline Software, Inc. **(800) 826-0313**	Vital Signs	VM/SP, VM/HPO	VM	IBM 370 architecture machines	Eliminates bottlenecks, improves I/O response time, optimizes placement of CMS minidisks	Yes	Historical, trend analysis, statistical analysis, correlation	Yes	Yes	Yes	I/O subsystem modeling	Yes	Landmark's CICS monitor	$8,800
Boole & Babbage **(408) 735-9550**	DASD Advisor	MVS/SP, MVS/XA, MVS/ESA	I/O response time	All IBM mainframes running MVS	Summarizes I/O subsystem performance, detects bottlenecks, analyzes cache effectiveness	Yes	I/O performance, summary, detail	Yes	Yes	Yes	Expert system, trends charting	No	Boole & Babbage Model 300	$24,750
	Model 300	MVS/SP, MVS/XA	MVS/SP, MVS/XA	All IBM 370 architecture machines	Provides on-line performance management and capacity planning	Yes	Work load service and activity levels, utilization statistics	Yes	Yes	Yes	Database planning, CMF extractor, cache modeling facility	Yes	None	$34.500 to $64,500
	Resolve Plus	MVS/SP, MVS/XA, MVS/ESA	MVS	All IBM mainframes running MVS	Troubleshoots, early warning of problems, information on allocation of common storage	No	Real-time screen	Yes	Yes	No	None	No	All standard MVS data security software	Starts at $18.000
	CICS Manager	MVS/SP, MVS/XA, MVS/ESA, DOS/VSE, CICS	CICS 1.60	IBM 4300, 3000 series and compatibles	Provides on-line CICS monitoring, batch reporting, tracking and graphics facility	Yes	Historical CICS activities	Yes	Yes	Yes	Long-term historical reports	No	CICS Pars, Adabas, DB2, DL/1, Datacom, CSP, Mantis, PCS	$8,000 to $23,750

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld.* When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

PERFORMANCE MANAGEMENT TOOLS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT NAME	OPERATING SYSTEM	ENVIRONMENT BEING MEASURED	HARDWARE PLATFORM	MAJOR FUNCTIONS	INCUDES REPORT GENERATOR	TYPES OF REPORTS PRODUCED	PROVIDES GRAPHICS ANALYSIS OF DATA	PERFORMS ON-LINE, REAL-TIME REPORTING	PERFORMS DATA ARCHIVING	INCLUDES WHAT KINDS OF CAPACITY PLANNING AIDS	INCLUDES MODELING FEATURES	INTERFACES TO WHAT OTHER SOFTWARE	PRICE
Boole & Babbage **(408) 735-9550**	DB2 Manager	MVS/XA	DB2	IBM mainframes running MVS/XA	Provides on-line monitoring of DB2 subsystems, exception warnings	No	None	No	Yes	No	None	No	Boole & Babbage performance products	$30,000
	IMF	MVS/XA	IMS/VS	IBM mainframes running MVS/XA	Provides on-line monitoring of MVS/VS, management reporting and accounting	Yes	Activity, summary, calendar for transactions, programs, databases	No	Yes	Yes	Historical reports	No	None	$12,500 to $35,000
Candle Corp. **(213) 207-1400**	Omegamon for IMS	MVS/370, MVS/XA, MVS/ESA	IMS	All IBM and compatibles running IMS	Isolates IMS bottlenecks, analyses resources and monitors service levels	Yes	Activity, summary, service level, bottleneck analysis	No	Yes	Yes	None	No	AF/Operator	$19,500 to $26,950
	Omegamon for CICS	MVS/370, MVS/XA, MVS/ESA	CICS/VS	All IBM and compatibles running MVS	Isolates CICS bottlenecks, analyses resources and monitors service levels	Yes	Activity, summary, service level, bottleneck analysis	Yes	Yes	Yes	None	No	AF/Operator	$23,500 to $28,050
	Omegamon for CICS under DOS	DOS	CICS, DOS	All IBM and compatibles running CICS and DOS	Isolates bottlenecks, analyses resources and monitors service levels	Yes	Activity, summary, service level, bottleneck analysis	Yes	Yes	Yes	None	No	None	$5,900
	Omegamon for VM	VM/SP, VM/HPO, VM/XA	VM	All IBM and compatibles running VM	Isolates VM bottlenecks, analyses resources and monitors service levels	Yes	Activity, summary, service level, bottleneck analysis	No	Yes	Yes	None	No	None	$7,500 to $17,000
	Omegamon for DB2	MVS/XA, MVS/ESA	DB2	All IBM and compatibles running DB2, MVS/XA, MVS/ESA	Monitors service levels and resources, alerts	No	NA	No	Yes	No	None	No	AF/Operator	$30,000 to $33,000
	Omegamon for MVS	MVS/370, MVS/XA, MVS/ESA	MVS	All IBM and compatibles running MVS/370, MVS/XA, MVS/ESA	Isolates MVS bottlenecks, analyses resources and service levels	No	NA	No	Yes	No	None	No	AF/Operator	$23,500 to $31,350
	Epilog for MVS	MVS/370, MVS/XA, MVS/ESA	MVS	All IBM and compatibles running MVS/370, MVS/XA, MVS/ESA	Monitors MVS service levels and resources, trending	Yes	Activity, summary, trending, service level	Yes	No	Yes	Trend analysis	No	SAS	$19,500 to $26,950
Carolian Systems International, Inc. **(800) 263-8767**	Sysview	MPE IV, MPE XL	MPE	HP 3000, Micro 3000 XE, GX, LX, 30, 40, 50, 925, 925LX, 60, 70, 930, 935, 950, 955	Monitors MPE and reports on bottlenecks, CPU utilization, response time, disk I/O	No	Detail, log, summary reports	No	Yes	Yes	None	No	Galcon	$2,000
	Sysplan	MPE IV, MPE XL	MPE	HP 3000, Micro 3000 XE, GX, LX, 30, 40, 50, 92S, 925LX, 60, 70, 930, 935, 950, 955	Provides historical data on system usage and performance, compares resources on a single machine or multiple machines	Yes	Summary, detail and log, graphics and trends	Yes	No	Yes	Trend analysis; machine site, resource comparisons; process filtering and comparison	No	DSG Graphics	$2,000
CIS Inc. **(617) 848-7515**	Quantum PM	VMS	VMS	DEC VAX	Monitors VMS performance, capacity planning, system tuning	Yes	User defined	Yes	Yes	Yes	Trend analysis	Yes	Proprietary	$1,000 to $54,000
Computer Associates International, Inc. **(518) 227-3300**	CA-Look	MVS/370, MVS/XA, VSE/SP	MVS, VSE, CICS, Roscoe, CA-Datacom/DB	IBM 3000, 4300 series	Monitors real-time performance, early warning system	Yes	Summary	No	Yes	Yes	None	No	CA-Roscoe	NP
	CA-Mindover MVS	MVS	MVS	IBM PC, AT, PS/2, mainframes and plug compatibles	Monitors MVS performance data, makes recommendations	Yes	Analysis, reasoning	No	Yes	Yes	None	No	CA-Look	NP
Concurrent Computer Corp. **(800) 631-2154**	Software Performance Monitor	Proprietary OS/32	Operating system and process	Concurrent 3200 series	Monitors system process performance, queues status, disk performance, memory utilization	Yes	On-line activity with logging playback	No	Yes	Yes	None	No	None	NP
Cullinet Software, Inc. **(800) 551-4555**	IDMS/R Performance Monitor	MVS, VM, MSP, BS2000	IDMS/R	All IBM 370	Real-time monitoring of chargeback, application tuning, wait analysis	Yes	Historical, wait, task analysis, user	Yes	Yes	Yes	None	No	Morino Associates' MICS, Allen Systems Group Prealert	$10,000 to $27,000
Daniel Computing Systems, Inc. **(403) 273-2657**	The Benchmark Monitor for RSX	RSX II	RSX II	DEC PDP-11	Analyzes RSX system load, tunes	No	NA	No	Yes	No	System loading analysis	No	None	$2,000
Database Utility Group, Inc. **(206) 878-1001**	Insight/DB2	MVS	DB2	IBM mainframes running MVS	Monitors DB2, improves response time, CPU utilization, identifies bottlenecks in code	Yes	User defined	Yes	Yes	Yes	Historical reports	No	DB2	$35,000
Datamax Computer Systems, Inc. **(206) 574-2334**	Virgo	MPX	Application task activity	Gould Concept series	Monitors disk access control	No	NA	Yes	Yes	No	Reports on space capacity of CPU	No	None	$7,500
Datametrics Systems Corp. **(703) 425-1006**	Viewpoint	MS-DOS	Unisys 1100/2200	Unisys 1100/2200; IBM PC, XT, AT, compatibles	On-line system monitoring, troubleshoots with expert system features	Yes	On-line and historical utilization graphs	Yes	Yes	Yes	Interfaces with Torch/PMS for historical trend analysis	No	Torch/PMS	$9,000 and up
	Torch/PMS	Unisys OS-1100/2200	Unisys SIP, MLF	Unisys 1100/2200	Provides historical database, statistical analysis of work load and performance, tunes	Yes	Activity, summary, critical factors, scatter plots	Yes	No	Yes	Analytic modeling	No	Viewpoint, Capacity/Q	$14,940
	Capacity/Q	MS-DOS	Any sized CPU	IBM PC, XT, AT, compatibles	Tunes CPU performance, provides system sizing, analytic modeling	Yes	Work load, device, memory summaries, path contention	Yes	No	Yes	Analytic modeling	Yes	Torch/PMS	NP
Digital Equipment Corp **(508) 493-5111**	VAX Performance Advisor	VMS, MicroVMS	DEC VAX, Vaxcluster	All VAX/VMS systems	Analyzes system performance, makes recommendations to alleviate problems	Yes	Analysis, performance, dump	Yes	Yes	Yes	Identifies possible performance problems	NP	VMS applications	NP
	VAX Software Performance Monitor	VMS, MicroVMS	VAX/VMS	All VAX/VMS systems	Collects VMS performance data used in tuning, helps resolve current and future performance problems	Yes	Resource utilization, load balancing, summary	Yes	Yes	Yes	Historical information on CPU usage	No	VMS applications	NP
	VAX Performance and Coverage Analyzer	VMS	VAX/VMS	All VAX/VMS systems	Collects and analyzes data on execution behavior of application programs	Yes	Histograms, tables, bar charts	Yes	No	Yes	Plans for continous system growth, tracks resource usage growth to plan timely upgrades	No	VMS applications	NP
DTA Software Products Group **(800) 521-6773**	DTA/LMON	DOS/VSE	Shared virtual area	All IBM 370 architecture machines	Measures size of SVA, reduction of I/O on SYSRES device	Yes	Phase loaded analysis, existing SDL/SVA overview	No	No	No	Phase loaded analysis reports	Yes	None	$1,700
Duquense Systems, Inc **(412) 323-2600**	Dasdmon	MVS	DASD	IBM mainframes running MVS	Provides DASD monitoring and tuning	Yes	Dataset usage	No	Yes	Yes	None	Yes	None	$8,750 to $26,250
	Netspy	MVS, VM	VTAM SNA environment	IBM MVS, VM	Reports network performance	Yes	Summary	Yes	Yes	Yes	Trend analysis, historical reporting	No	Morino MICS/SNA	$15,000 to $30,000

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PERFORMANCE MANAGEMENT TOOLS

COMPANY	PRODUCT NAME	OPERATING SYSTEM	ENVIRONMENT BEING MEASURED	HARDWARE PLATFORM	MAJOR FUNCTIONS	INCUDES REPORT GENERATOR	TYPES OF REPORTS PRODUCED	PROVIDES GRAPHICS ANALYSIS OF DATA	PERFORMS ON-LINE, REAL-TIME REPORTING	PERFORMS DATA ARCHIVING	INCLUDES WHAT KINDS OF CAPACITY PLANNING AIDS	INCLUDES MODELING FEATURES	INTERFACES TO WHAT OTHER SOFTWARE	PRICE
EEC Systems, Inc. (508) 443-5106	Turbodisk I/O Analyser	VMS	I/O activity	DEC VAX	Monitors transfer, identifies origin of information on nodes, tracks number of files accessed	Yes	Files access	No	Yes	No	Reports on most often accessed files	No	None	$500 to $10,000
Gejac, Inc (301) 725-2500	ARSAP Resource Management + Chargeback Systems	VMS	VAX/VMS	DEC VAX, Microvax, Vaxcluster	Monitors resource management, organization accounting performance management	Yes	User utilization, organizational summaries; project, application and terminal usage	Yes	Yes	Yes	Color graphics displays, bargraphs	No	IBM accounting, Datatrieve	$5,000 to $25,000
Goal Systems International, Inc. (800) 848-4640	Explore/CICS for VSE	VSE 1.2, VSE1.3, VSE/SP, CICS	CICS	IBM 4300, 3000 series; 370	Monitors CICS activityand thresholds on multiple CICS systems	Yes	On-line, batch history, histograms, graphic displays for CICS	Yes	Yes	Yes	History report writer	No	SAS, MICS, Explore/VSE, Explore/VM	$7,500 to $8,900
	Explore/VSE	DOS/VSE, DOS/VS, DOS/SP	VSE	IBM 4300, 3000 series; 370	Provides real-time VSE performance monitoring, reports contention between data sets	Yes	History, histogram, activity, response time, resource	Yes	Yes	Yes	History report writer	No	Explore/VM	$7,500 to $8,900
	Explore/VM	VM/SP	VM	IBM 4300, 3000 series; 370	Monitors VM performance, flashback reporting	Yes	DASD, batch reports on trend analysis, histogram, summary	Yes	Yes	Yes	DASD modeling tool	Yes	Explore/VSE, Explore/CICS	$7,500 to $8,300
	Explore/VM/XA(SP)	VM/XA(SP)	VM/XA(SP)	IBM 4300, 3000 series; 370	Monitors VM/XA performance and thresholds, flashback reporting	Yes	DASD, plotted, graphic, tabular	Yes	Yes	Yes	DASD modeling tool	Yes	Explore/VSE, Explore/CICS	$10,000 to $11,000
	Explore/CICS for MVS	MVS/SP, MVS/XA, CICS/VS	CICS	IBM 4300, 3000 series; 370	Monitors CICS performance and thresholds, flashback reporting	Yes	DASD, plotted, graphic, tabular reports	Yes	Yes	Yes	None	No	Explore/VM, Explore/VSE	$18,000 to $20,000
H + A Computer Services, Inc. (800) 654-3215	PFA	EDX	CPU utilization, disk I/O	IBM Series 1	Identifies I/O bottlenecks, suggests system reorganization	Yes	Program utilization summary, dataset summary	No	Yes	No	None	No	None	$1,500
	RT1	EDX	Terminal	IBM Series 1	Monitors response, pinpoints slow applications, performs program audits	No	NA	Yes	Yes	No	None	No	None	$965
Help/Systems, Inc. (612) 933-0609	Auto Tune	CPF, O/S 400	Memory usage, activity level environment	IBM System/38, AS/400	Makes automatic adjustments	Yes	Historical, statistical	No	Yes	Yes	None	No	None	$1,750 to $4,275
Hewlett-Packard Co. Contact local sales office	HP LaserRX	MPE	MPE	HP 3000	Monitors CPU performance, terminal response time, resource usage trends	No	Process level, summary, tabular	Yes	No	Yes	Presents past data in trend format	No	ASCII files	$8,650 to $24,850
	HP Glance/V	MPE	MPE	HP 3000	Monitors on-line system performance monitoring, terminal response time	No	None	No	Yes	No	None	No	None	$600 to $1,800
IBM Contact local sales office	VM Performance Planning Facility	VM	VM/SP, VM/SP HPO	IBM 9370, 4381, 3090, 3030, 3080	Estimates system performance, suggests configurations upgrades, tunes	Yes	Summary, user, I/O subsystem, reference	Yes	No	Yes	Estimates performance on a proposed configuration under projected work loads	Yes	GDDM, APL, Fortran, ISPF	$31,000
	Resource Measurement Facility	MVS/ESA, MVS/XA, MVS/370	MVS/ESA, MVS/XA, MVS/370	IBM 9370; 3090, 3030, 3080, 4300 series	Measures work load delay, data utilization, user activity	Yes	CPU, DASD, channel, work load	Yes	Yes	Yes	NP	No	GDDM, ISPS	NP
	Service Level Reporter	MVS/ESA, MVS/XA, MVS/370	MVS/ESA, MVS/XA, MVS/370, VM/SP, VM/SP HPO	IBM 9370; 3090, 3080, 4300 series	Monitors processor management, service level, availability, performance and tuning, capacity planning, operations, problem and change management	Yes	MVS, IMS, CICS, VM and network	Yes	No	Yes	Forecasting, compound growth and modeling	Yes	GDDM, ISPF	$900
	RTM/SF Realtime Monitor/Systems Facility	VM/XA SF, VM/XA SP	VM/XA SF, VM/XA SP	IBM 4380, 3080, 3090 series	Real-time reporting of performance	Yes	Logs	No	Yes	No	None	No	GDDM, PL/1	$7,875
	VM Real Time Monitor	VM/SP, VM/HPO	VM/SP, VM/HPO	IBM 9370; 3090, 3080, 4300, 3030 series	Real-time reporting of performance	Yes	Logs	No	Yes	No	None	No	None	NP
	VM Performance Reporting Facility	VM/XA SP	VM/XA SP	IBM 3090, 3080, 4380 series	Reads VM/XA monitor data and produces performance reports, creates history files	Yes	DASD, processor, paging, transaction	No	No	Yes	None	No	PL/1	$5,500
	VM Monitor Analysis Program	VM/SP, VM/SP HPO	VM/SP, VM/SP HPO	IBM 9370; 3090, 3080, 4300, 3030 series	Reads VM/SP or VM/SP HPO monitor data and produces performance reports, graphic interpretation of performance data	Yes	Activity, summary	Yes	No	Yes	Long-term trend information	No	PL/1	NP
Landmark Systems Corp. (800) 227-8911	The Monitor for CICS	MVS/SP, MVS/XA, VSE	Applications programs used, CICS	IBM 370 architecture machines	Provides relative and batch reporting, application tuning and debugging	Yes	Activity, summary, on-line graphics batch	Yes	Yes	Yes	Storage analysis, history utilization	No	PARS, MICS, SAS	$8,000 to $21,000
MacKinney Systems (714) 882-8012	Peekcsa	MVS, DOS, CICS	CICS	IBM 370; 4300, 3000 series; 9370	Interactively displays major fields from major control blocks, displays FCT buffer, monitors maxtask and program compression activity	No	Activity log, interactive summary	No	Yes	No	Documentation to assist in tuning current system	No	None	$695
	CICS/Response Time Monitor	MVS, DOS, CICS	CICS	IBM 370; 4300, 3000 series; 9370	CICS terminal response times on-line and through batch, automatically notifies exceeding of user-defined thresholds, logs information	Yes	Activity log, batch summary and detail, average response time and number of transactions	Yes	Yes	Yes	Evaluates CICS performance by response time	No	None	$695
Macro 4, Inc. (800) 223-0414	System Accounting	DOS/VSE, VSE/SP	CICS, DOS/VSE, VSE/SP	All IBM mainframes and plug compatibles	Secures data collection, supports 4GLs and DL/1, numerical and graphic reporting, capacity planning	Yes	DOS tuning and capacity planning, CICS usage audit control, CPU usage	Yes	Yes	Yes	Interfacing with VPAC for system wide capacity planning, reporting and historical statistic analysis	No	Reporter, VPAC	NP
	VM Performance and Accounting Control	VM	VM	All IBM mainframes and plug compatibles	Monitors device statistics from mini-disk to channel, archives historical performance, detects virtual machine loop, automatically controls resources	Yes	Current and historical data, audits	Yes	Yes	Yes	Reporting and historical statistics analysis, interfaces with system accounting, capacity planning	No	Reporter, VM security packages system accounting	NP
McCabe & Associates, Inc. (800) 638-6316	Analysis of Complexity with Battlemap Tools	DOS, SUN, VMS, Ultrix, Domain/IX	Intermodule control flow	SUN, Apollo, DEC VAX, HP and DEC workstations, IBM PC, XT, AT and compatibles	Analyzes source code, identifies test paths and test conditions, reverse engineering	Yes	Annotated source listings and flow graphs	Yes	No	Yes	None	Yes	None	NP
Measurement Technology Corp. (609) 424-4846	Electronic Measurement System	Any	CPU, I/O rates	Any	Measures CPU busy time, multiprocessor, analyzes I/O activity	Yes	Detailed, summary, graphs	Yes	Yes	Yes	Saves historical data	No	None	$80,000
Morino, Inc. (703) 734-9494	TSO/MON	MVS	TSO, TSO/ISPF	IBM and compatibles running MVS	Monitors command, resources, system performance and user measurements	Yes	Activity and summary in both trend and profile for 12 months	Yes	Yes	Yes	None	No	MICS Performance Management/ Capacity Management/ Accounting	$26,100 to $46,800

“He was about to spend millions on a system that could become obsolete tomorrow.
Ulcer material.
I gave him some insurance.”

– Carol McLarty, AT&T Branch Manager

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"He was redesigning the company's information network. Mainframes and business computers, phone systems, data communications equipment, the whole shebang. And he was justifiably concerned.

What if the system that was perfect for his company today couldn't adapt to new technologies in the future? What if it all became obsolete in five years? It could happen.

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Other vendors say they have connectivity and flexibility, but it's only within their own system. AT&T offers it from one system to another.

Whether you use our equipment or someone else's.

Since our approach is communications-based, we're able to give you greater control over your communications by putting the power of the AT&T Network into your own hands. For instance, with an AT&T PBX and departmental computer capabilities, you can free your mainframes from managing communications and let them do the job they were meant to do.

But, most important, AT&T's open-ended solutions help protect your investment, which will enable you to add new equipment as new technologies are developed, without scrapping all the equipment you already have.

Partnering with us now can provide you systems with the future built in. That's the best insurance anyone could have."

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PERFORMANCE MANAGEMENT TOOLS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT NAME	OPERATING SYSTEM	ENVIRONMENT BEING MEASURED	HARDWARE PLATFORM	MAJOR FUNCTIONS	INCLUDES REPORT GENERATOR	TYPES OF REPORTS PRODUCED	PROVIDES GRAPHICS ANALYSIS OF DATA	PERFORMS ON-LINE, REAL-TIME REPORTING	PERFORMS DATA ARCHIVING	INCLUDES WHAT KINDS OF CAPACITY PLANNING AIDS	INCLUDES MODELING FEATURES	INTERFACES TO WHAT OTHER SOFTWARE	PRICE
NCR Comten **(612) 638-8685**	Comten Communications Alerting Facility	Comten COS	Measures condition of communications lines	Comten 3695, 5620, 5660	Provides real-time status, sends status information from remote CAF node to other node, alerts when communications line do not meet parameters	No	NA	No	Yes	No	None	No	None	$902 to $2,706 for annual license
	Comten Overview	DOS	Comten communications processor activity	Comten T-4062, 5620, 3695, 5660	Monitors incoming information, builds and stores command list, alerts	Yes	External report generator dependent	Yes	Yes	Yes	None	Yes	Packages capable of taking asynchronous data files	$2,200 for annual license
Northwest Digital Software Inc. **(509) 447-5631**	RPM	RSTS/E Version 7.1 to 9.6	Total system performance	DEC PDP-11	Finds bottlenecks on system, identifies causes of performance problems	Yes	Program examination, system analysis, plots, graphs	Yes	Yes	Yes	None	No	None	$3,500
On-Line Software, Inc **(800) 642-0177**	Stabiline/CICS	DOS/VSE, MVS, MVS/XA	CICS	IBM 370; 3000, 4300 series and plug compatibles	Detects and describes most CICS system errors, text diagnostics	Yes	Summary and detailed	No	Yes	No	NP	No	Intertest	NP
Operations Control Systems **(415) 493-4122**	OCS/Express	MPE	CPU utilization	HP 3000 series	Job scheduling, queue management, resource chargeback, job performance for HP 3000	Yes	Activity, resource requirements, summary, pre/post production	Yes	Yes	No	Forcasts work load, identifies jobs to run and job requirements	Yes	ASK, Collier Jackson, OCS/Librarian	$10,000
PAE Inc. **(508) 744-8612**	Tuner/438 (Charlie)	CPF	All active subsystems	IBM System/38, AS/400	Adjusts storage, adjusts activity levels, tunes machine pool	Yes	Sumary, activity	Yes	Yes	Yes	Ability to configure environments	Yes	None	$2,100
Programart **(617) 661-3020**	Strobe	MVS/370, MVS/XA, MVS/ESA	Batch, CICS, DB2, IDMS/DC	IBM 370; 3000, 4300, 9300 series	Measures system resources used by application program or on-line subsystem	Yes	Resource demand distribution, wait time by module, intensive procedures, I/O facility utilization summary	Yes	No	No	None	No	Permites by Intercomm feature	$50,000
Raxco, Inc. **(301) 258-2620**	Rabbit-2 VAX/VMS Performance Analyzer/Capacity Planner	VAX/VMS	VMS	DEC VAX	Performs VMS analysis and capacity planning, security	Yes	Utilization histograms, ranking; system wide profiles	Yes	Yes	Yes	NP	No	Rabbit-1 Resource Accounting, VMS Accounting, VMS Monitor	$499 to $8,995
Rimaco Software, Inc. **(713) 946-0724**	Facility Administration Assistance Program	VOS proprietary	Disk, CPU	All Harris processors	Monitors disk, CPU utilization; disk defragmentation, data archive	Yes	Disk storage, CPU usage, summary	No	Yes	Yes	NP	Yes	None	$6,600
Softlight Corp. **(803) 833-6127**	Performance Analyst	SSP	CPU, DASD usage	IBM System/36	Runs SMF to collect data, summarizes key performance indicators, maintains history for capacity planning	No	Summary, exception, detail, historical	Yes	No	Yes	Summary statistics from each measurement run	No	IBM Query/36, PC Support/36	$199
	Response Time Analyst	SSP	Local workstation response time	IBM System/36	Measures response time for local workstations, reports after each run	No	Summary, detail, historical	No	No	Yes	Summary statistics from each measurement run	No	IBM Query/36, PC Support/36	$199
Software AG of North America, Inc. **(800) 853-9534**	Review	MVS, MVS/XA, MVS/ESA, DOS, VM	Adabas, Complete TP monitor, Natural	All IBM 370 architecture machines	Monitors application usage, response time, tuning, debugs applications	Yes	Activity, summary, exception	Yes	Yes	Yes	Historical data for trend analysis	Yes	SMF	$4,500 to $31,050
Software Clearing House, Inc. **(513) 579-0455**	S.A.T.	VRX/VRXE	Performance and trend analysis, operations tracking, system cost accounting, audit reporting, chargeback	NCR 8500, 8600, 9800	Performance and trend analysis, operations tracking, system cost accounting, audit reporting, chargeback	Yes	Job activity; working set estimator, compute priority and job priority analysis; monthly trends summary	Yes	No	Yes	Key indicator analysis reports, trend summaries, resource utilization graphs, summary of key indicators	No	None	$4,500
Software Extraordinaire **(206) 282-9422**	Performance Analyzer	Wang VS	Wang VS	All Wang VS	Monitors CPU and I/O utilization, tuning	Yes	Resource utilization, memory usage, balancing and tuning, historical usage	Yes	No	Yes	Historical reports for resource utilization trends	Yes	SAM II, SAM III	$3,300
Software Innovations, Inc. **(603) 883-9300**	Sii/Benchmark	Unix System V	Timesharing	All supporting Unix System Y	Monitors disk performance, terminal performance	No	Experimental run summary	No	No	No	Work load modeling language	Yes	None	$995
:Sysmgr **(415) 550-1454**	:Perfmgr	AOS/VS, AOS/VS II	Load and resource consumption, response time, disk field structure organization, application behavior	Data General MV	Collects performance data continuously, displays in real time, analyzes and reorganizes disk file structure	Yes	Load and resource consumption, 24 general	Yes	Yes	Yes	Long-term load and resource consumption trends reports	No	DG's third-party decision support, graphical analysis, statistical analysis package	$499
Technetronic, Inc. **(800) 267-3550**	Explicit SNA Network Performance Analyzer	IBM SNA	SNA, IBM Network Logical Data Manager	IBM mainframes, compatibles running MVS	Summarizes performance data, interactively displays graphics, summarizes data sent to PC AT or PS/2	Yes	Graphical reports of NPM and NLDM	Yes	No	Yes	Analytic queueing models	Yes	SAS	$40,000
Texas Instruments, Inc. **(800) 537-3500**	Texas Instruments Personal Consultant Easy	DOS	Application programs	TI Businesspro, IBM PC, XT, AT, PS/2, compatibles	Monitors the application program and alerts user to problems when they occur	Yes	Consultation results	Yes	No	No	None	Yes	Lotus 1-2-3, Dbase, DOS files	$495
	Texas Instruments Personal Consultant Plus	DOS	Application programs	TI Businesspro, IBM PC, XT, AT, PS/2, compatibles	Monitors the application program and alerts user to problems when they occur	Yes	Consultation results	Yes	No	No	None	Yes	Lotus 1-2-3, Dbase, DOS files	$2,950
	Texas Instruments Procedure Consultant	DOS	Application programs	IBM PC, XT, AT, PS/2	Monitors the application program and alerts user to problems when they occur	No	NA	Yes	No	No	None	Yes	TI Personal Consultant	$495
UIS, Inc. **(800) 332-8650**	V-X Manager	VMS	YAX/VMS	DEC VAX	Monitors peak usage of CPU, memory, I/O resources and file activity	Yes	Disk management, summary, activity	No	No	Yes	Accumulated record of snapshot usage over months	No	None	$1,800 to $12,000
Universal Software, Inc. **(203) 792-5100**	Insight	DOS/VSE	DASD	IBM 4300, 3000 series; 9370	Monitors DASD system and tunes, evaluates software performance	Yes	Graphs, various activity and summary	Yes	Yes	Yes	CPU and DASD analysis	No	USI Jaz, CAMS	$8,000
VM Software, Inc. **(703) 264-8000**	VMmonitor	VM	VM	IBM mainframe and plug compatibles	Memory use inquiry, device monitoring, disconnected virtual machine monitoring	Yes	Reports form VMcenter II	Yes	Yes	Yes	None	No	VMcenterII	$3,250 to $20,000
VM/CMS Unlimited, Inc. **(800) 527-3237**	VM/DMAP	IBM VM/SP, VM/MPO	VM minidisk and DASD	IBM 4300, 3030, 3090 series; 370, compatibles	Identifies unused data, monitors DASD performance, cross-volume conversion, controls DASD space	Yes	Utilization by volume, minidisk utilization, DASD to DASD conversion, DASD volume cost	Yes	Yes	Yes	Space usage trending, DASD utilization	No	None	NP
	VM/CMAP	VM/SP, VM/HPO, VM/XA	CMS	IBM 4300, 3030, 3080, 3090 series; 370, compatibles	Monitors CMS performance, work load analysis and accounting	Yes	Summary	No	No	Yes	CMS command frequency and response time trending data	No	Profs, Focus, SAS	NP
Wang Laboratories, Inc. **(617) 459-5000**	SAM III System Activity Monitor	Wang VS, VS OS, 6.00, 7.00	VS, CPU	Wang VS	Monitors memory, disk utilizations, data reduction, background data collections, performance reporting	Yes	Timeline, summary, characteristics, I/O	No	Yes	No	None	No	None	NP

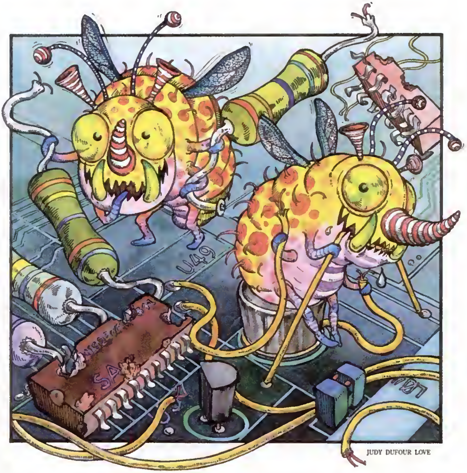
Managing the virus threat

How MIS can protect data from the gremlins of today's computer systems

BY JOHN D. McAFEE

What keeps today's MIS managers tossing and turning in their collective sleep at night? Some would say computer viruses.

Once thought to be only science fiction, viruses have emerged as a serious threat to MIS, with a measurable impact in lost money, man-hours and computing resources. Last year, more than 400 occurrences of infections involving nearly 90,000 computers were reported to the Santa Clara, Calif.-based Computer Virus Industry Association (CVIA), and it is estimated that an equal or greater number went unreported.



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The costs of these infections are staggering. Estimates of the damage inflicted by November's Internet infection alone ranged upwards of $100 million in lost machine time, lost access and direct labor costs for recovery and cleanup. And this was from a virus supposedly not intended to cause damage.

Other viruses may have been less dramatic or sudden, but collectively the disruptions have been as severe as the Internet virus. The impact from continued reinfections — a common occurrence — stretched into many months for some installations; for a few firms, irretrievably lost data has had a permanent impact on operations.

The virus scourge has caught most in MIS unprepared. Time-honored methods of data protection are by and large ineffective against viruses, and MIS' preconceptions often hinder rather than help its efforts to guard information, personnel resources and uptime.

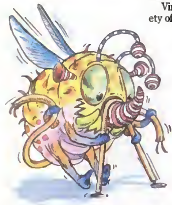
A prime example is the dependence on backups as a front-line defense against viruses. Because viruses can remain hidden for months or even years prior to activating and causing damage, an infected system's backup can also become infected. The backups merely ensure that the virus will also be restored in the event of an unexpected data loss. Additionally, newer viruses specifically attack standard backup/restore programs, so that backup tapes are guaranteed to be garbled.

Existing security systems are also usually ineffective

- **Costs of infections are staggering**
- **Spread unknowingly by "friendly" hands**
- **Mainframes are not immune**

McAfee is chairman of the Computer Virus Industry Association and president of Interpath Corp., both based in Santa Clara, Calif.

against viruses. Most systems were designed to restrict access to only "trusted" individuals or system elements. Viruses, however, are invisible to the human eye and are nearly always spread unknowingly by "friendly" hands. Even operating system elements of secure systems may become infected and thus spread the infection through normally restricted channels.



The situation is worsened by the seemingly uncontrollable rate of replication that has been reported. For the first two months of 1988, fewer than 3,000 infected machines were reported; for the last two months of 1988, more than 30,000 newly infected devices were reported (see chart at right). The Internet virus alone infected 6,200 machines in a matter of hours.

The number of individual virus strains is also increasing. Seven distinct viruses had been identified by February 1988. Today the number of individual strains has risen to more than 30. All indications point to a rapidly increasing rate of infection and more trouble on the horizon.

Viruses appear in a wide variety of forms. Some are extremely small and compact, consisting of as few as 20 instructions encompassing fewer than 50 bytes. Others are significant structures, as complex as an operating system and consisting of many thousands of instructions.

Some viruses move rapidly from computer to computer, destroying data or programs soon after the initial infection. Others have a slower rate of infection and may wait for two or three years before activating and causing damage. Some viruses infect the system's memory and are always active, while others attach to a specific program and are only active when that program is executed.

A few viruses, such as the Pakistani Brain, have been discovered that are completely inert (see chart page 93). That is, they replicate and cause widespread infection but they have no function other than replication — they cause no damage, display no message and otherwise do not interfere with a system in any way. At the other extreme, viruses exist that completely eradicate all information in the computer and on all connected storage devices.

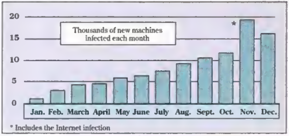
The vast majority of viruses identified so far affect personal computers — mostly IBM PCs, compatible workstations and Apple Computer, Inc. Macintoshes. In fact, no disruptive viruses have as yet been identified that specifically target mainframe systems. This does not mean, however, that mainframes are immune from the effects of a typical virus infection. Far from it.

The increasing tendency to decentralize processing and then transfer files from personal computers or workstations to a data-collection function at the mainframe opens mainframe database systems to critical vulnerabilities.

Many viruses subtly modify data rather than instigate widespread destruction. They target information in a PC spreadsheet or database or other data files. They may move a decimal place to the left or the right, add or take away a zero, change a 1 to a 7, an 8 to a 3 or make other modifications that are difficult to trace and easy to overlook. An infection in a corporation's PC base from this type of virus would inevitably lead to widespread corruption of the mainframe's data through file and data transfers.

The computer virus epidemic spreads

In 1988, there was a steady increase in the number of computer devices infected by various viruses



* Includes the Internet infection

SOURCE: COMPUTER VIRUS INDUSTRY ASSOCIATION
CW CHART: DOREEN DAHLE

Levels of infection

Viruses enter a corporate installation through one of the following three ways:

- **From an infected diskette from an outside source.** This may be from an employee doing work at home or at another site who accidentally infects a diskette and returns it to the office, a salesperson bringing a demonstration system into the workplace, a diskette returned by a customer or client, a service representative bringing diagnostic diskettes to troubleshoot a computer problem or any source from which diskettes may be introduced into the environment.
- **Through acquisition or movement of infected machines.** This may be the transfer of a computing resource from one division to another or through the acquisition of an

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infected supplier's machine.

- **Through electronic communications.** Any transfer of executable code through remote links, consolidated data networks, gateways, dial-up connections or other pathways can lead to the introduction of a virus.

After the virus has been introduced into the environment, it begins its replication task and spreads throughout the installation, affecting stand-alone computers, local-area networks and ultimately the central system. The longer a virus remains undetected, the more widespread the infection will be and the more difficult the task of removal becomes.

If a virus can remain undetected long enough to infect vast numbers of removable media, then the probability of reinfection — even after discovery and cleanup — is very high and the ultimate cost to the organization will be substantial. If the virus can be identified and dealt with soon after the initial infection, however, then removal is usually a simple process and the impact is low.

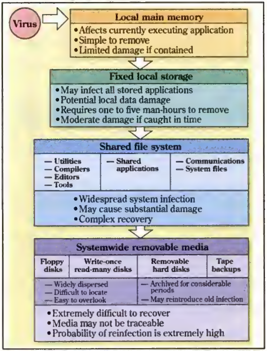
There are four stages in the infection process, and each stage requires more time and resources for recovery (see chart at right):

- **Local memory infection.** When a virus first enters a computer, it searches for the type of program on the local storage files to which it has been instructed to attach. It may remain in memory for hours, or sometimes days, before finding an appropriate host. It may infect a single operating system file on the hard disk, the hard disk's boot sector or one or more applications, but widespread infection of the fixed disk storage does not usually begin right away.

If a virus can be discovered and contained in these early hours, then the removal process is simple and straightforward. Powering down the system, rebooting with a clean diskette and removing the one or two infected elements on the hard disk are all that is necessary. In addition, it is vital to identify any diskettes that have been inserted into the system since the infection, and close scrutiny is suggested. Of course, the diskette containing the original virus must be located and destroyed. Beyond that, little is required.

How bad is it?

There are four stages of viral infection


Virus
Local main memory
•Affects currently executing application
•Simple to remove
•Limited damage if contained
Fixed local storage
•May infect all stored applications
•Potential local data damage
•Requires one to five man-hours to remove
•Moderate damage if caught in time
Shared file system
— Utilities
— Compilers
— Editors
— Tools
— Shared applications
— Communications
— System files
•Widespread system infection
•May cause substantial damage
•Complex recovery
Systemwide removable media
Floppy disks
Write-once read-many disks
Removable hard disks
Tape backups
— Widely dispersed
— Difficult to locate
— Easy to overlook
— Archived for considerable periods
— May reintroduce old infection
•Extremely difficult to recover
•Media may not be traceable
•Probability of reinfection is extremely high

SOURCE: COMPUTER VIRUS INDUSTRY ASSOCIATION CW CHART: FRANK C. O'CONNELL

- **Local disk storage infection.** If an infection goes undetected, then over time the virus will infiltrate an increasing number of programs filed away in the local storage. The virus may infect each program as it is executed, or it may periodically scan the disk, looking for appropriate hosts, and perform a static infection of the first uninfected host it finds. Eventually, every stored program could become infected, and the removal process then becomes more involved.

At this level of infection, recovery may involve loss of data. Depending on the type of virus, the number of infected programs and whether the virus has begun to disrupt data files, the only course of action may be to reformat the media. Backing up programs or even data files prior to the reformat can be dangerous at this level of infection due to the risk of reinfection during the restore process. A total loss of data on the affected disk could then result.

- **Shared-file system infection.** If an infected computer is connected to a LAN or to any system that provides shared data and program files for multiple workstations, then there is a risk of the virus infecting the shared file system. If a file server becomes infected, then every workstation that has access to the shared files will very rapidly become infected. The workstation infection will occur whenever the workstation executes any infected program stored at the file server. This level of infection can have systemwide consequences, and recovery is a complex task.

Infections of shared-file systems usually involve large numbers of programs. Utilities, compilers, editors, tools, system files and a wide variety of applications

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S/36
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COMPUTERWORLD

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The most common computer viruses

Scores

Origin: Electronic Data Systems, Dallas, fall 1987

Host: Macintosh

Class: Generic application infector

Description:
- Infects any application
- Increases application size by 7K bytes
- Seeks out new hosts at 3½-minute intervals
- Creates Notepad and Scrapbook files in system folder
- Creates invisible Scores and Desktop files
- Looks for existence of specific file names for destruction

How spread:
- Exchanging infected disks
- Inserting disk into infected system

Symptoms:
- Slowdown of system
- Problems with printing
- System crashes
- File size increases
- Notepad and Scrapbook icon modifications

Potential damage:
- Lost data due to system crashes

Precautions:
- Do not exchange disks with others
- Do not insert disks containing programs into other systems
- Do not execute programs from unknown sources

Recovery:
- Back up all data files
- Erase the infected disk and all affected disks
- Restore system files and applications from masters
- Restore data files

Notes: Changes the small Mac icon for Notepad and Scrapbook into generic dog-eared page icons.

Lehigh

Origin: Lehigh University, Bethlehem, Pa., fall 1987

Host: IBM PCs and compatibles

Class: System infector

Description:
- Infects COMMAND.COM file
- Changes size by approximately 20 bytes
- Changes creation date and time
- Activates after four infections
- Destroys all system data

How spread:
- Sharing infected disks
- Inserting a clean disk into an infected system

Symptoms:
- Change in size of COMMAND.COM
- Loss of all system data

Potential damage:
- Loss of all data on hard disk

Precautions:
- Do not transfer application programs on a system disk
- Do not insert any system disk into another computer
- Monitor COMMAND.COM file for date/size changes

Recovery:
- Power down system
- Reboot from original write-protected system master
- Delete COMMAND.COM from hard disk and all infected floppies
- Restore COMMAND.COM from original master

Notes: Because of a very short activation period (four infections), the chances of detection before data destruction are slim.

Alameda

Origin: Merritt College, Oakland, Calif., spring 1988

Host: IBM PCs and compatibles

Class: Boot infector

Description:
- Replaces original boot sector with itself
- Stores original boot sector on first free sector
- Infects through software reboot sequence
- Does not flag original boot sector as unusable

How spread:
- Booting from a disk of unknown origin
- Inserting a clean boot disk into an infected system

Symptoms:
- Slow boot sequence
- System crashes
- Lost data

Potential damage:
- Loss of data

Precautions:
- Boot only from one write-protected floppy
- Do not boot hard-disk systems from a floppy
- Do not insert boot disks into another system

Recovery:
- Power down the system
- Boot from a write-protected original master disk
- Execute the DOS SYS command to replace boot sectors of disks

Notes: Does not protect the original boot sector after infection. By accident, the original instructions may be overwritten, and boot failure then occurs.

Pakistani Brain

Origin: Lahore, Pakistan, January 1986; developed by two brothers as an experiment

Host: IBM PCs and compatibles

Class: Boot sector infector

Description:
- Replaces original boot sector with itself
- Moves original boot sector to another location
- Adds seven sectors that contain remainder of virus
- Flags all modified sectors as unusable to protect itself
- Replicates onto all inserted bootable floppies

How spread:
- Booting from unknown or shared disks
- Infects through any access to an inserted disk
  - Listing directories, executing programs and so on
  - Through software reboot sequence

Symptoms:
- Copyright @BRAIN label displayed on infected disk
- Reboot sequences slowed down
- Excessive floppy activity for simple tasks
- Program crashes for some versions of DOS
- Interrupt vectors modified

Potential damage:
- System crash can cause loss of data
- Spreads quickly to all bootable disks

Precautions:
- Do not boot from unknown floppies
- Boot only from the hard disk if one exists
- Write-protect all boot disks

Recovery:
- Shut down infected systems
- Reboot from a clean, write-protected original boot disk
- List directories of all disks — look for @BRAIN label
- When found, destroy the disk, or:
  - Perform DOS SYS command to rewrite boot sector
  - Recreate volume serial label using any available utility (This procedure will still leave seven bad sectors with dead virus)

Notes: Will live through software reboot.

nVIR

Origin: Hamburg, W. Germany, summer 1987

Host: Macintosh

Class: Generic application infector

Description:
- Appears in many varieties, each with individual activation characteristics. Publication of the source code for this virus is primarily responsible for the wide variations. The infection techniques are similar, however.
  - Places nVIR resource in system file; code resource in application
  - Once system is infected, every application executed is infected

How spread:
- Sharing of disks
- Inserting disk into infected system
- Executing on infected program

Symptoms:
- Vary greatly because of the large number of varieties; some common symptoms are the following:
  - System crashes
  - A "beep" when an application is opened
  - With Macintalk installed, the message "Don't panic" is heard
  - Files disappear

Potential damage:
- Loss of data and programs
- Frequent system crashes

Precautions:
- Do not share disks with others
- Quarantine infected systems
- Do not work with original master disks

Recovery:
- Back up data files
- Erase infected disks
- Restore programs from original master copies (write-protected)
- Restore data files

Notes: Particularly virulent and can infect all programs within an infected system in a matter of minutes.

Israeli

Origin: Hebrew University, Jerusalem, December 1987

Host: IBM PCs and compatibles

Class: Generic application infector

Description:
- Infects any .COM or .EXE program
- Increases program's size by about 1.8K bytes
- Infected programs are modified to become memory-resident
- Programs are infected when executed in infected system
- Floppy or hard disk can become infected

How spread:
- Transfer of infected programs to floppies
- Inserting floppies into infected computers

Symptoms:
- General slowdown of the system
- Programs disappear on Friday the 13th
- .EXE files continue to grow in size until too large to execute
- Available system memory decreases

Potential damage:
- Some versions destroy all data on the hard disk
- Stored programs will disappear

Precautions:
- Do not execute programs from unknown sources
- Do not exchange disks containing executable code
- Monitor memory allocation and program file sizes

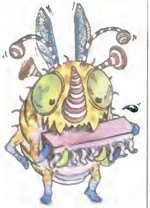
Recovery:
- Power down the system
- Boot from a write-protected original boot disk
- Delete all executable programs on hard disk and affected floppies
- Replace programs using original distribution disk

Notes: A bug in the original virus caused .EXE files to become infected over and over, which made the .EXE file sizes increase until the programs could no longer fit into memory. This problem has been removed in later versions by unknown hackers.

SOURCE: COMPUTER VIRUS INDUSTRY ASSOCIATION are usually present at file server nodes. All of these elements can be potential hosts for a virus. The more programs that are infected, the more difficult the recovery is. Like infections of local workstation storage, if the infection is sufficiently widespread, then the shared file media may have to be reformatted to clean out the virus.

Recovery from this level of infection is complicated by the fact that many, if not all, of the connected workstations will be infected. If the infection is not removed from each and every workstation at the same time, then reinfection is certain to occur, and the cycle will begin again.

- **Infection of systemwide removable media.** An infected computer will infect many of the diskettes that are inserted into it. These can be newly formatted diskettes, data diskettes or program or system diskettes. The virus will also infect write-once read-many (WORM) disks, removable hard disks, reel and cartridge tapes and any other writable/removable media that are attached to the system. Over a period of months, a single infected computer can infect hundreds of media elements. Some of these elements — for example, floppies and WORM disks — are highly portable, widely dispersed, easily misplaced and difficult to control. Others, such as removable hard disks and tape backups, are archived for considerable periods and can keep a virus in "cold storage" indefinitely, where it is always poised to be reintroduced into a clean system.



Once a virus has infected large numbers of computers on a network, the number of infected removable media elements will begin to skyrocket. Eventually, if the virus continues to go undetected, a stage is reached in which the probability of identifying and recovering all of the infected media is virtually zero. Diskettes may have been carried out of the building — to other offices, to homes or to client sites. Some may be filed away and overlooked. Others may have been relabeled and recycled without first being reformatted. And there could always be a diskette languishing under a stack of papers in someone's desk drawer that will be discovered months or even years later, perhaps long after the infection is forgotten.

When the number of such media devices reaches the thousands — a common situation — the probability of reinfection after the virus is removed becomes very high. Some installations have suffered through more than a dozen such reinfections. The cost becomes enormous.

Safeguards

Clearly, the earlier you identify an infection, the better off both you and your company's data are. If you can detect and remove a virus before it begins its disruptive phase, then you can avoid the consequences of data corruption or loss. If you stop the infection before it becomes too widespread, then you localize the cleanup task and ensure successful removal. The problem, of course, is finding the virus in time. Or, better yet, preventing the infection from occurring in the first place. Fortunately, there are workable solutions to these problems.

To reduce the threat of infection, MIS can implement policies and procedures that restrict the potential entry of viruses into an environment as well as integrate infection-prevention software products that can prevent a virus from replicating itself if a system does become exposed.

The single most effective policy that can be implemented in a

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corporate environment is to prohibit the use of public-domain and shareware software programs. Such software products carry a high risk of infection, and the indiscriminate duplication of public-domain programs makes auditing and tracking them very difficult. A blanket policy forbidding their use will go a long way toward providing a measure of security.

An effective second step is the implementation of procedures that govern the way in which "homework" is handled. It is common practice today for professionals to transport diskettes from work to home and back. Many have PCs or workstations at home, and the convenience, not to mention increased productivity, of finishing up a report or a spreadsheet before returning to work in the morning is one of the major benefits of our increasing access to computers.

It is also a major avenue of corporate infection. Procedures to monitor and control this media flow are essential. Simply requesting, for example, that no diskette containing an executable program be transported between work and home will dramatically cut down the risk of infection. It is extremely difficult for viruses to infect a data-only diskette.

Other simple and easy-to-implement procedures include limiting the transmission of executable programs over networks wherever possible; write-protecting all program and system diskettes; never booting hard-disk systems from a floppy unless it is the original, write-protected system master; never executing programs of unknown origin; never using network file servers as workstations; and never adding data or programs to system master diskettes.

Prevention products

The above procedures, if followed thoroughly, will greatly reduce a company's exposure to infection. In addition, the use of infection-prevention products can be beneficial. These products are generally software terminate-and-stay-resident (TSR) programs that monitor all system activity and look for characteristic viral-replication signs. They can prevent, for instance, any attempted modification of the boot sector, operating system module or application program. These products normally display a warning to the user when an attempted infection is identified.

While such products can be useful, and while they provide a statistical margin of safety, they have two drawbacks. First, they are not effective against all types of viruses. For example, boot-sector viruses — viruses that replace the boot sectors of hard disks and floppies — cannot be stopped by these types of products, and certain types of system infectors are immune. The second drawback is that most of these products produce a certain number of "false positives" — that is, virus warnings that are not really viruses.

Certain legitimate programs, for example, may at times perform a function that looks very much like a virus, and this function will be suspended by the virus-prevention product, which will display a warning. If a large number of false positives are produced, then eventually the user may become desensitized and may ultimately ignore a warning about a legitimate virus.

In spite of these drawbacks, however, infection-prevention products, if correctly applied, can be powerful tools for minimizing infection risks.

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infection, then you must at least detect an infection as soon as possible after it has occurred. The longer a virus remains undetected, the greater the damage and the larger the cost of recovery will be. Virus detection falls into two categories: user training in the procedures for detection and the use of products specifically designed to detect viruses.

Even though viruses are for the most part invisible to a casual observer, a trained user can spot many of them, given the right circumstances. Viruses, for example, must replicate in order to spread, and the replication process takes time. Thus, an infected program may exhibit a slight delay, perhaps one or two seconds longer than normal, each time the program is executed.

Likewise, disk accesses for normally simple tasks may take noticeably longer. So an alert user, watching for changes in the pattern of the system's activities, may often notice the signs of a virus.

A small-scale employee-training program can be beneficial in helping the organization detect viral infections. The subtle symptoms of infection can often betray a lurking virus if the user knows what to look for. Users should ask themselves the following questions:

- Do program loads take longer than normal?
- Do disk accesses seem excessive for simple tasks?
- Do unusual error messages occur with regularity?
- Do access lights turn on for unreferenced devices?
- Do I have less memory available than usual?
- Do programs or files mysteriously disappear?
- Do I notice a sudden reduction in disk space?
- Have any executable files changed size?
- Are unexplainable hidden files present?

In addition to user vigilance, procedures and training, special-purpose infection-detection products are available that can prove very helpful in catching a virus. They work by detecting changes in critical segments of the system that would normally be changed only by the presence of a virus.

These products can be highly effective, with the following caveat: The system must be clean — uninfected — at the time the product is initially installed. Unlike the infection-prevention TSRs that prevent the virus from getting onto the system, infection-detection products detect the virus after it has infected the system.

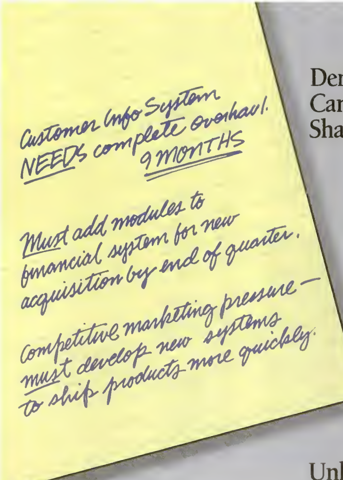
THE SUBTLE symptoms of infection can often betray a lurking virus if the user knows what to look for.

These products function in one of two ways — either by vaccination or by logging procedures. Vaccination products modify the programs in a system to include a self-test mechanism. This mechanism executes each time the program is loaded and the self-test checks the program for infection.

Logging programs read and log critical information about all segments of the system, and then they compare this log to the current system state each time the computer is turned on or rebooted. Both techniques have their pros and cons, but both are also highly effective. Unlike the infection-prevention products, detection products are usually able to catch both boot-sector viruses and operating system infectors, as well as generic program viruses.

The CVIA distributes a public information package that can help MIS installations trying to find the right virus prevention or detection product for their needs.

There are many options available to MIS for minimizing the risks of computer virus infection and for identifying infection after it has occurred. The judicious application of the right procedure or tool to the right environment should provide a margin of safety that will allow the average data processing manager to enjoy untroubled sleep in these high-risk times. ■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— Alec Gindis
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Danek Bienkowski

Ten causes of project busts

Managers see it happen all the time. A project begins its life healthy and vigorous with members full of enthusiasm. Then the project develops the symptoms of project apathy — the budget soars out of control, unforeseen disasters delay completion of key tasks, and team members are overscheduled and overworked. The project manager is left to ask, "What went wrong?"

Why do some projects languish while others thrive? There are 10 major causes of project mortality.

1. The project is a solution in search of a problem. Projects that fail often were not conceived in response to a definite problem, and the objectives of the project were not stated clearly enough at the outset.

A project to procure a microcomputer system and software for a company's sales department, for example, is not a valid objective. The real objective is to improve the sales department's productivity by automating its customer database. The resolution of that business problem becomes the objective

Continued on page 102

MIS on track at CSX

Cooper brings business savvy to transport giant

BY ROSEMARY HAMILTON
CW STAFF

Jack Cooper is as smooth and polished as any chief executive you'll find. He has to be. As manager of the MIS shop at the railroad division of CSX Corp., a $6 billion transportation company, he is not just overseeing computer operations. He's running a business.

Cooper says he needs as much business sense as technology know-how to run CSX Technology, which operates as a separate profit-and-loss division that sells services to CSX. According to Cooper, his Jacksonville, Fla.-based division is as responsible as other CSX units for the future of the company.

"It started in 1980 when we were deregulated," Cooper says. "Now the marketplace, not the government, determines our destiny. I see it as a jungle, and only the fittest will survive."

Sharp edge

Cooper's ability to closely align technology with business goals is his most significant contribution to the company, says Karen Baughman, a senior director at CSX Technology who is in charge of financial and administrative applications as well as end-user support.

"He makes sure the projects we're working on give CSX a competitive edge," Baughman says. "We don't have technology goals. We have business goals."

But Cooper is aware that technical people have their own career plans and typically like to work on the most current technologies to stay competitive, Baughman says. As such, he encourages staff people to use new technologies to achieve CSX business goals. This approach keeps MIS happy and satisfies corporate goals at the same time, she says.

Early riser

Cooper, 48, who has held MIS jobs since 1960, looks like he should be talking about business instead of computers. He arrives, fit and trim, for a breakfast meeting at a time when most people have just stepped out of their morning showers.

He's already completed his morning jog. His day is packed with appointments, and he wraps up his final meeting in his car while driving to the airport. He is headed for corporate headquarters in Richmond, Va., for a retirement party that evening. The car meeting is interrupted once while Cooper discusses a problem with a colleague in Baltimore who tracked him down on his car phone.

Cooper enjoys talking about the railroad business and CSX Technology's place in it. He and his staff refer to CSX users as customers because the division sells its services to them. He says an important aspect of his job is to work closely with senior management to promote MIS and ensure that his division's goals dovetail with overall corporate goals.

"All of us at the senior level are promoting ourselves and trying to get resources," he says. "But it can't be done with just arm-waving. It has to be documented, and you have to sell hard and effectively."

Cooper said the phrase "technology as a competitive weapon" is overused these days but that it is worth believing in anyway. As such, he has been pushing this philosophy since his arrival at CSX from The Williams Cos. in Tulsa, Okla.

Cooper had spent one year as director of computer systems development and planning at this

Continued on page 101

PROFILE

Jack Cooper

RON BELL/PICTURE GROUP

Position: *President, CSX Technology*

Mission: *To run CSX Technology as a profitable chargeback business within CSX Corp. and support CSX's business goals by implementing strategic systems*

Hire stakes

FROM PAGE 1

other and recommending to their cohorts those candidates who don't fit their own needs. Similar consortia have sprung up in Chicago and Atlanta.

- Before the stock market crash in October 1987, Fidelity Investments in Boston was growing so fast that it regularly found itself with 120 openings in the MIS department.

To combat this situation, the company instituted a lucrative employee referral bonus ($2,000 for any referred candidate who was hired), and for added incentive, Fidelity raffled off Mercedes-Benzes and trips to Tahiti to MIS people who brought in new talent.

- General Electric Co. in Fairfield, Conn., is so large and diverse that the company decided that its most fertile recruiting ground for MIS was right in its own backyard. GE designated an internal IS recruiter to facilitate the movement of these professionals.

The company regularly moves high-tech types from one division to another — NBC to GE Capital Corp., for example — rather than look outside. And in support of the "grow your own" model, the corporation instituted an innovative two-year IS training program for college recruits.

According to Richard Bell, staffing manager at Arthur Young in Dallas and a driving force behind the formation of the high-tech consortium, there are really no new ideas in recruiting, just old ideas with new wrinkles.

JOHN MARTINI

Chase Manhattan's Delaney

"When we've been able to find the people we've wanted, we've had no trouble getting them," adds W. Ford Calhoun, vice-president of information systems at Smith Kline & French Laboratories in King of Prussia, Pa. "The trouble is finding them. We've tried some of everything and haven't struck a rich vein yet. We tend to get the best people through word of mouth."

Always moving

Finding and hiring quality IS professionals is not a fixed endeavor. The search is fluid, changing from region to region, company to company, specialty to specialty.

New York, according to recruiters there, is edging toward a buyers market as the supply starts to outweigh demand. "It's not a buoyant market anymore," says Chester Delaney, vice-president and manager of systems human resources at Chase Manhattan Bank.

"At the more senior levels, it's definitely become a buyers' market." The Southwest, conversely, is still white-hot for IS pros but residual fallout from the poor economy continues to make it hard to find quality people. While companies constantly search for an edge in recruiting, the truth is that there is no secret formula for success.

Says one recruiter, "A guy hot in one market could be stone cold in another." One company needs MVS/XA and DB2 experience, another seeks VAX specialists. Technical profiles may vary, but professional recruiters

Continued on page 100

Hire stakes

CONTINUED FROM PAGE 99

say some traits are necessities.

The most sought-after candidate combines business and technical skills, someone who can implement as well as help formulate strategies. For upper- or middle-level IS positions such as systems analyst or project leader, companies will go far for such a broad-based individual.

"There's definitely a shortage of people with that good balance," says James R. Yoakum, senior vice-president of information systems for Marriott Corp. in Bethesda, Md. "You can grow your own, but it takes years to do that."

"If companies default on anything, it's on the technical side. They prefer the better business skills as long as the person is 'snow-proof' — that is, they know enough technology to not get snowed," adds Allan Grossman, senior partner at A. Davis Grant & Co., an executive search firm specializing in IS in Iselin, N.J.

The business-plus-technical label is like gold in recruiting, but as one recruiter says, "Everyone in MIS thinks they fit that description now, but they don't."

Though recruitment woes vary dramatically, a consistent concern for human resource managers mandated to find IS professionals is to lower or eliminate expensive agency fees. Harvey Daniels, president of the Technical Recruiters Network (TRN), a Chicago-based group of companies helping each other find high-tech help, estimates that recruitment costs can run from $2,500 to $20,000 or more per hire. TRN, which includes such companies as United Air Lines and Montgomery Ward & Co., excludes headhunters and works to reduce hiring costs by having its members cooperate with each other.

Arthur Young's Bell

"The main value is just knowing the other recruiters from our 110 member companies. We know what others need and can help with those tough openings," Daniels says. "We ran a career fair last year that attracted everyone from entry-level to senior-level executives. Every company that participated got at least one hire. Montgomery Ward hired 72 people."

The Southwest High Technology Consortium, a similar organization in Dallas, was born out of a more dramatic need. In just a few short years, more than 20,000 high-tech professionals fled from Houston alone. The resource base of qualified IS pros became so depleted that local companies found themselves desperately recruiting from other areas of the country. The fees paid to employment agencies and search firms soared and people like Arthur Young's Bell realized that something had to be done.

Bell and several of his counterparts in local companies decided to band together, forming a cooperative in 1985.

The results were stunning: Arthur Young saw its search agency fees drop from $200,000 in 1984 to $6,000 in 1985. Another Dallas member saw its fees tumble from $500,000 to zero in two years. Of the 60 people Arthur Young hired in 1985, half came from referrals from the co-op. Bell claims that member companies throughout the entire region now spend less on agency fees than was spent in Dallas alone before.

Today, the co-op boasts 160 member companies and has spread to cities across the Southwest. "I realized that I interview many more candidates than we can hire," Bell says. "So rather than sticking the resume in a file and forgetting about it, I can refer the person to a company whose needs he might fill."

> IN JUST a few short years, more than 20,000 high-tech professionals fled from Houston alone.

Both Bell and Daniels insist that expected pitfalls have not materialized. Member firms don't raid each other's vaults for people without permission. If someone is anxious to leave for another firm in the cooperative, it is pointless to try to stand in their way, Bell says. "If more than one company wants the same person, give it your best shot and let the chips fall where they may," he says.

Another way to reduce agency fees, especially for large corporations, is moving people internally. GE's Bob Matthews, manager of information technology professional and management development, oversees a corporatewide network that helps move interested IS professionals from one GE business unit to another. "I act as an internal search firm," Matthews says. " Our whole focus is to move people from within."

Playing off that philosophy, GE instituted its Information Systems Management Program (ISMP), a two-year training program for college graduates. The ISMP assignments allow candidates to receive hands-on training to prepare for IS management careers.

Despite such innovations, the tried-and-true methods of recruitment remain robust and healthy. Advertising, job fairs and employment agencies continue to

Continued on page 101

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MIS on track

CONTINUED FROM PAGE 99

gas exploration and production company before seeking out the top job at CSX. He has a mix of MIS experience from both the commercial and academic worlds, having spent seven years as vice-president of computer services at the University of South Carolina before joining Williams. But he clearly favors the commercial side.

"I'm an enthusiastic supporter of the free enterprise," Cooper says. "I love the competitive atmosphere."

CSX Technology's goal has been to bring automated systems and productivity tools to the railroad division that allow it to offer services a cut above its competitors. Many of these projects are now nearing completion, while others have just recently been implemented.

Reading the board

An executive information system, for example, was recently developed to give senior managers desktop access to both internal information and a host of public bulletin boards. Cooper said the goal is to improve an executive's ability to spot trends and act quickly on them. With the new system, a user can retrieve daily revenue totals every morning and catch a trend within a few days rather than waiting for weekly or monthly results to be sent to him from the corporate database.

The most obvious competitive IS weapon at CSX is the Transportation Management System (TMS), a complex, $75 million project that is just nearing completion after beginning five years ago. TMS, written in-house, includes several application modules that rely on multiple databases running on IBM 3090s.

TMS manages the several thousand transactions that occur daily in the railroad division, including routine billing and new applications such as a monitoring tool that can report the exact location of every railroad car at any time.

Cooper claims that few systems compare to the car-tracking capability of TMS. The application allows CSX to realize shipping delays before a customer does and alert that customer, who will appreciate the active service CSX can now offer.

> "I'M AN enthusiastic supporter of the free enterprise. I love the competitive atmosphere."
>
> JACK COOPER
> CSX TECHNOLOGY

Hire stakes

CONTINUED FROM PAGE 100

play key roles for most firms. Sheryl Kay, a high-tech recruiter based in Tampa, Fla., points out, "If you are looking for somebody who speaks Spanish and has two years of AS/400 experience, you're going to need a search firm to find him."

Large firms such as United Air Lines have actually hired professional recruiters on staff. But as Ron Palmera, a technical recruiter at United, says, "When it comes to vice-presidential-level searches, [the company] doesn't even tell us. They go right to an executive search firm."

At Source EDP, a San Francisco-based high-tech employment agency, Dave Grinnell, director of advertising, says firms may look at agencies as the last resort, but that still translates into plenty of business: "If a company tries to fill a position on its own and gets a million resumes, it's not cost-effective for them to handle it. Eventually, they turn back to the agencies because that's what we do well."

Wish list

Those being recruited for MIS positions have their own set of criteria. According to Allan Grossman, senior partner at the executive recruiting firm of A. Davis Grant & Co. in Iselin, N.J., the three most important ingredients for middle- to upper-level job seekers are these: how much impact they will have on the business and the company, how quickly and reasonably they can advance through the organization and salary. A high salary never hurts, Grossman says.

Another critical ingredient is the hiring organization's technology. State-of-the-art computers generally bespeak a serious commitment by upper management to information systems. Mostly, though, "people get excited by a company that is successful," says Jay Verneuil, vice-president of corporate information systems at GE Capital Corp. in Stamford, Conn.

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Bienkowski

CONTINUED FROM PAGE 99

of the project.

As a reminder to the project team, it may be wise to record the objective formally in a problem statement defining the scope or boundaries of the project as well as constraints such as deadlines, budget ceilings or limited resources under which the project must operate.

2. Only the project team is interested in the end result. Even a project with the clearest and most vital objectives is doomed from the start if no one other than the project manager and team recognizes the objectives as vital. Every project needs someone who realizes the need it is designed to fill and without whom the project has a good chance of producing a result no one can use.

3. No one is in charge. A postmortem on a failed project often reveals one error — namely, that no single person had overall responsibility for the project. Someone was given the nominal title of project manager but not the corresponding authority to effectively manage the project. Likewise, project management by committee can be a problem, especially in matrix-structured organizations.

4. The project plan lacks structure. Many projects encounter trouble because critical tasks are overlooked in the planning phase or are not scheduled in proper sequence. The project plan must be well-structured so that it is more than just a long list of tasks with no discernible interrelationship.

A good project plan requires a work breakdown structure that defines the project's major phases as well as its individual tasks and subtasks. This breakdown structure should be so clear that a diagram can be drawn from it.

5. The project plan lacks detail. Another common planning mistake is underdevelopment, a paucity of task descriptions at the level of actual physical work. When planning is incomplete, the result is an absence of detail.

With many unknowns at a project's beginning, schedules and cost estimates in a top-down plan are generally based on rule-of-thumb calculations and ballpark figures, resulting in a plan that cannot be developed to the level of detail needed for actual assignment of work.

Conversely, a bottom-up plan works in the opposite direction, from specific tasks to the end product, with schedules and budgets calculated for individual tasks combined to arrive at the overall schedule and budget for the project. Different systems used for top-down and bottom-up computing may lead to inconsistencies between plans, which must be resolved before implementation of a project can get under way.

6. The project is underbudgeted. A budget usually is based on the broad top-down plan produced early in the project's life or set as an initial constraint; neither method is reliable in predicting the actual costs of a project. It is essential to reappraise and, if necessary, revise cost estimates early in the project and at regular intervals throughout its life. The first budget review, which should follow completion of the bottom-up plan, will provide increased detail for a more accurate cost estimate.

Resolving variance between the revised cost estimate and the original budget deserves priority because if a project must be ended for budgetary reasons, it is better to do it before more time and money are wasted.

7. Insufficient nonfinancial resources are allocated to the project. An adequate budget is critical to a project's success, but other resources such as staff, equipment and space are also vital. Critical to a project's success is dedication to it by senior management, those people who are crucial in allocating the resources needed. One way to gain management's dedication to your project is a well-thought-out and well-documented plan.

8. The project is not tracked against its plan. What happens to the proposed project plan after it is presented to senior management? Planning must work in tandem with tracking the project, comparing the actual progress of the project with its plan.

Of primary importance is the establishment of a feedback mechanism for the project team to use in reporting actual data on a project — start dates, completion dates and other "actuals," those amounts of work effort actually executed on tasks.

9. The project team is not communicating. Chaos results when members of a project team neglect to inform each other about the status of their work and what remains to be done. The project manager must ensure that each team member has the information — changes in plans, shifting of responsibility, progress reports and unanticipated problems, for example — needed to do his part of the project.

10. The project strays from its original goals. Despite starting a project with clearly defined aims, it often will stray because of changing circumstances or altered allocation of resources. Any major redirection of the project must be analyzed for its impact on original objectives and how new objectives are related to the original plan. It requires formal and careful analysis for its economical, technical and operational feasibility, and it may mean that part or all of the project must be replanned.

Bienkowski is vice-president of Applied Business Technology Corp., a project management software developer in Cambridge, Mass.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Lee Gruenfeld

Who owns the software?

Imagine that you are the president of Acme Manufacturing, and you hire Ace Computing to develop an accounts receivable system for your company. It is a completely custom job, based purely on Acme's user specifications, funded completely by Acme and done on its own computers by Ace personnel.

In the absence of a written agreement to the contrary, whom would you suspect owns the finished system?

Intuitively, you would guess Acme. However, the Copyright Act of 1976 says otherwise. In fact, if you subsequently found that Ace was licensing an exact duplicate of your system to your competitors at a fraction of what you paid to have it developed, there would likely be very little you could do about it. According to Section 210 (b) of the Act, Ace would probably own the software.

And if you try to use it in a new Acme subsidiary, Ace could sue you and probably win.

Why is this so, and what can you do about it?

Many traditional assumptions changed with the new Act, and, under current law, ownership of a piece of software initially vests with the author. There is one notable and important exception to this default — namely, systems developed under the new "works made for hire" doctrine.

There are two basic conditions under which software ownership can safely (to the degree that any legal assumption is "safe") be assumed to *not* reside with the author.

First, if the work is commissioned as part of a larger work, it will be owned by the owner of the larger work. Definitions can be a bit tricky, though. Is Acme's accounts receivable system stand-alone or is it "part of" its overall financial systems?

Second, if the development is done by an employee within the scope of his/her employment, the software is clearly owned by the employer. However, you must be certain that

Continued on page 108

Creative financing name of their game

BY CLINTON WILDER
CW STAFF

NEW YORK — They don't write code, sell timesharing or develop networks. But from their 36th floor office with its sweeping view of lower Manhattan and New York Harbor, the principals of Welsh, Carson, Anderson & Stowe have become a significant force in the software and services industry.

Their product? Deals.

With the recent proliferation of leveraged buyouts, white-knight takeover defenses and other complex financial mechanisms in the computer industry, Welsh Carson has seen its traditionally low profile raised by a fair amount. The 10-year-old investment and venture capital firm has orchestrated several well-publicized deals, including the white-knight buyout of Decision Industries Corp. and the restructuring of Mohawk Data Sciences Corp.'s service business into Momentum Technologies, Inc.

Such creative financings may not be as glamorous as, say, Kleiner, Perkins, Caufield & Byers' high-growth venture investment in Tandem Computers, Inc. or Benjamin Rosen's investment in Lotus Development Corp. and Compaq Computer Corp. But Welsh Carson has flourished in its niche and now controls more than $500 million in capital resources.

"When everyone else was doing high-flying hardware and software companies, we were plodding along doing buyouts of services providers," said general partner Patrick J. Welsh, formerly president of Citicorp Venture Capital. General partner Bruce K. Anderson added, "We are interested in firms that use applied technology, not technology per se."

ANDY FREEBERG

Welsh Carson's Anderson (*left*) *and* **Welsh** (*right*)

Time was ripe

Anderson, along with two other general partners, spent several years at Automatic Data Processing, Inc. (ADP), where he became executive vice-president and a board member before leaving to co-found Welsh Carson in 1979. Anderson, who was instrumental in the acquisition strategy that fueled ADP's consistent growth, believed that the computer services industry was ripe for an independent investment firm to play a part.

But convincing banks and financiers to invest in Welsh Carson's first $20 million fund was a tougher sell. "Bruce and I sat down on Christmas Eve in 1978. We had enough money between us for one pitcher of beer at the Steak & Ale, and we wondered if we were going to make it," Welsh recalled with a smile. "But things started to break in January, and we made our goal by February."

Since then, the financial hand of Welsh Carson has been all over the software and services industry. The firm's stable includes disaster recovery pioneer Sungard Data Systems, Inc., printer and maintenance vendor Genicom Corp., savings and loan industry processing services provider Fiserv, Inc. and Digital Equipment Corp. financial software developer Ross Systems, Inc.

Welsh Carson typically will take a firm through several

Continued on page 108

Prime Computer putting up Duke(s)

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — More than 2,000 employees at embattled Prime Computer, Inc. turned out last week to cheer fighting words from Massachusetts Gov. Michael Dukakis — the latest voice in the campaign to turn back the hostile takeover advances of MAI Basic Four, Inc. and its chairman, controversial corporate raider Bennett LeBow.

Referring to LeBow and other raiders as "corporate buccaneers and pirates," the governor declared himself and his administration staunchly against "hostile, leveraged takeover attempts . . . subsidized by the federal tax laws." Such acquisitions, he said, debilitate firms, leech revenue away from technological research to squander on antitakeover defensive maneuvers and must have America's international competitors "laughing all the way to the bank."

Dukakis conceded that "What a state can do is limited, legally." However, he said, no such limits circumscribe the power of persuasion.

According to Massachusetts Secretary of Economic Affairs Grady Hedgespeth — who joined the governor and other ranking members of the Dukakis administration at the Prime rally — Dukakis wrote last week to Michigan Gov. James Blanchard to urge him to rethink the Michigan state pension plan's recent tender to MAI of 5% of Prime's outstanding stock.

Dukakis' address came after a 90 minute-long private meeting with leaders of People Against Corporate Takeovers (PACT), a recently formed amalgamation of Prime's Employees Against the Takeover (EAT) and Grass Roots Initiative by Polaroid Employees (GRIPE), EAT's analog at nearby Polaroid Corp., currently the target of a hostile takeover attempt by Burbank, Calif.-based Shamrock Holdings.

What's the difference?

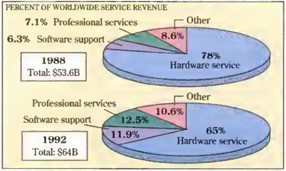
Asked to distinguish between MAI's advances on Prime and Prime's own hostile takeover of Massachusetts neighbor Computervision Corp. a year ago, Dukakis did not hesitate. In contrast with Computervision, "these companies [Prime and Polaroid] are being acquired to be destroyed," he said. "You cannot put up the kind of debt that [MAI and Shamrock, re-

Continued on page 106

Data View

Service industry forecast

Professional services most lucrative as maintenance market subsides



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Inside

- Network Management flexes its revenue muscles after purchasing Account Data Group. Page 106.
- Nynex subsidiary cuts one-fourth of jobs at Atlanta headquarters. Page 107.

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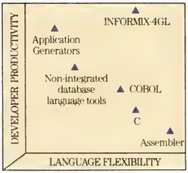

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Network Management augments arsenal

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Network Management, Inc. in Fairfax, Va., announced last week that it has purchased Account Data Group, Inc., the latest in a series of acquisitions intended to make Network Management a $100 million "end-to-end network integrator" by year's end, according to company Chairman Howard Frank.

The latest Network Management addition is a $10 million Washington, D.C.-based firm said to be the nation's eighth-largest local-area network systems integrator. Account Data Group evaluates, designs and installs turnkey LAN solutions, according to company President Tim O'Brien. The firm has been the largest Banyan Systems, Inc. value-added reseller through 1988, he added.

Last November, Network Management put a key element of its strategy into place with the the acquisition of Network Analysis Corp.'s Network Analysis Center division, which sells a popular family of network design tools called Modular Interactive Network Designer. Frank is the former president and co-founder of Network Analysis Corp.

With the addition of Account Data, Network Management will be able to provide a full range of network integration services ranging from initial design and product selection to network management and maintenance, Frank said. Furthermore, he noted, the addition of Account Data should make the company more than twice the size of its competitors in the LAN integration market.

COMMUNICATION
NETWORKS
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Network Management currently targets network facilities management in government and LAN systems integration in all sectors — two market areas now doing a booming business, according to Frank.

A future focus of the firm is managing network facilities for commercial companies — a small $10 million to $15 million market that is starting to grow. Account Data should help the organization gain a foothold in the commercial network integration market by initially addressing such firms' LAN integration needs, Frank said.

That market has been heating up because corporate information systems departments lack the resources to manage their companies' burgeoning LAN installations, Frank said. Such companies, while they may have organizations to deal with telecommunications and host networks, frequently lack a formal infrastructure for managing LANs, he added. Often, individuals or user groups initiate a LAN implementation independently of information systems, only to discover that there is no one willing or able to manage the networks on an ongoing basis, O'Brien said.

Prime

CONTINUED FROM PAGE 103

spectively] are putting up and run a profitable company."

Prime Chief Executive Officer Anthony Craig echoed the sentiment. "After loading on this kind of debt," he said of the highly leveraged MAI offer, "there's not a lot of operating income left over for research and development. I seriously question which of our customers would buy from a company carrying this kind of debt."

Many, according to Allen Michel. An assistant professor at the Boston University School of Manangement and a takeover consultant to both would-be acquisitors and target companies, Michel said that hostile takeovers are getting unfairly bad press these days.

> "THESE COMPANIES [Prime and Polaroid] are being acquired to be destroyed."
>
> MICHAEL DUKAKIS
> GOVERNOR OF MASSACHUSETTS

Takeovers, Michel said, are more likely to aid than impede the country's ability to compete in the worldwide market. Corporate acquisitors, he said, are in business to make money — something they will do only by running the companies they acquire more efficiently than their predecessors did.

Users of acquired technology, Michel said, stand to benefit just as stockholders do. "Users want stability," he said. "They don't care whether the name on the box is Prime or MAI."

In one regard, however, Michel wholly concurred with prevailing sentiment at Prime. "If the MAI takeover goes through, we're going to see lots more hostile takeovers in the computer industry. Many feel that this is the beginning of a trend," he said. "I think they're right."

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Nynex Business Information Systems to cut 25% of staff

BY WILLIAM BRANDEL
CW STAFF

ATLANTA — Nynex Business Information Systems Co. will eliminate nearly one-fourth of the job slots in the Atlanta headquarters of its Business Centers division, the company announced last week.

A company spokesman said 16 full-time employees of the New York-based Nynex Corp. subsidiary were released last week in an effort to streamline business operations and reduce administrative expenses. The Atlanta headquarters houses staff and market support functions, the spokesman said.

Part-time position cuts

Over the next two months, 44 more employees — in this case, part-time or temporary workers — will depart as their jobs are phased out, according to the spokesman. Only administrative and clerical positions will be cut, he said, and the number of marketing and sales positions will not be reduced.

The staff reduction, the spokesman said, stems from job redundancies that have surfaced as the Business Centers division has absorbed 80 former IBM Product Centers that were acquired by Nynex in 1986.

Prior to the acquisition, the Business Centers division consisted of 20 computer reseller stores operating under the name Datago. Over the past three years, Nynex Business Information Systems has closed 20 redundant stores, leaving the company with a current total of 80 Business Centers sites.

Last week's move has nothing to do with the other Nynex businesses, the spokesman said.

IN BRIEF

Sneaking around?

The announcement was made so quietly and briefly (seven lines released earlier this month) that it virtually sneaked into town, but it is a fact nonetheless: **IBM** bought 40% of **Interact Corp.**, a privately held software development company formed in 1987 as a joint venture between New York-based Advanced Computer Techniques Corp. and LSI Logic Corp. A **Prudential Bache Securities, Inc.** subsidiary picked up 11% of Interact; the remaining 49% is still in the hands of parent Advanced Computer Techniques. Why? None of the trio are talking.

……

Gotcha!

Amdahl Corp. is about to pay approximately $30 million in Amdahl stock to acquire **Key Computer Laboratories, Inc.** and that company's Unix expertise and scalar mainframe technologies.

On another front, Reston, Va.-based **VM Software, Inc.** last week acquired Waltham, Mass.-based **DB View, Inc.**, a purveyor of products for use with IBM's popular DB2 relational database management system. The latest move in VM Software'a expansion strategy cost the company approximately $2.5 million plus contingent payments that could add up to as much as $1.4 million, according to a company spokesman.

……

Out and up

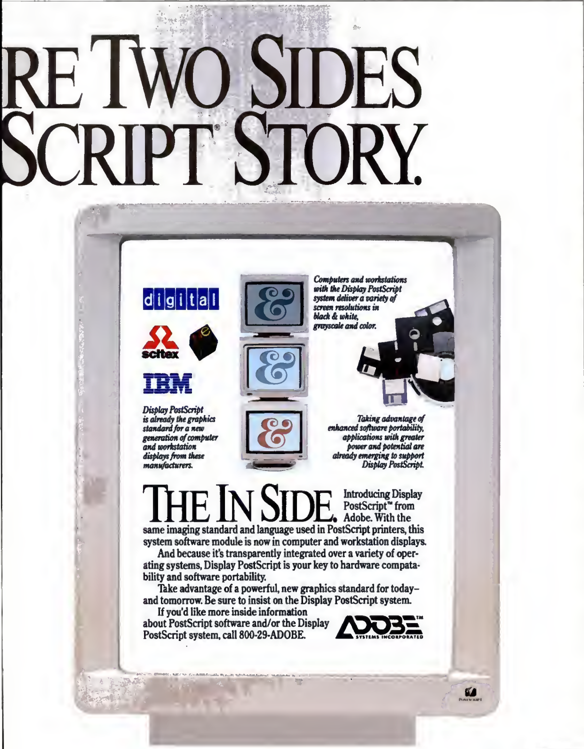
Ivan Selin, chairman of Arlington, Va.-based **American Management Systems, Inc.** since the company'a 1970 start, will resign his post next month — in all probability to assume a new job: President Bush recently announced that he would nominate Selin as undersecretary of state for management. The company is scheduled to designate a new chairman later this week.

……

Your move, Nintendo

The battle of the video game makers continued last week as Nintendo of America, Inc. slapped Atari Games, Inc. and Tengen, Inc., an Atari subsidiary, with a patent-infringement suit. Atari's offspring, according to Nintendo'a claim, is manufacturing and selling game cartridges that use Nintendo-patented "security chip" technology aimed at keeping unauthorized software from playing on hardware systems.

The action came as an amendment to an earlier Nintendo vs. Atari complaint, also alleging patent infringement. Between the two, Atari got in its own strokes, suing Nintendo on grounds of antitrust and racketeering.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Gruenfeld

CONTINUED FROM PAGE 103

the developer is really an employee as defined by applicable law. Declaring someone an employee doesn't mean anything if the actual conditions of that employment do not meet regulatory definitions.

Right to it all

Also, "scope of employment" means that programming is part of the job definition. If your operations manager takes it upon himself to write a fleet management system without waiting for the information systems department to do it, he will likely have all the rights to the system. This would not be the case for a programmer in IS who is being paid to write programs for your company.

Two actual cases will underscore the practical consequences of the Act.

In *BPI Systems* v. *Leith*, BPI was hired by Commodore Computer to write an accounts receivable system. BPI in turn hired an individual named Leith to write the actual programs. Subsequent to the completion of the work, Leith was found to be selling the same system to other companies on his own. There was no attempt on his part to be surreptitious: He even left references to BPI in the code.

When BPI sought to enjoin Leith from continued sales, the court denied it an injunction based on the weakness of its case. The system did not fall under the "works made for hire" rule, nor did the contract specify that the rule would be in effect.

More recently, an independent contractor won $2.5 million from Bank of America after claiming that the bank stole software it had paid him to write for it.

Irony of it all

The most ironic aspect of this complex situation is that a well-written contract is all it takes to spell out precisely and unambiguously exactly who owns what and what everybody's rights are. None of the Copyright Act applies when there is mutual agreement on the disposition of rights.

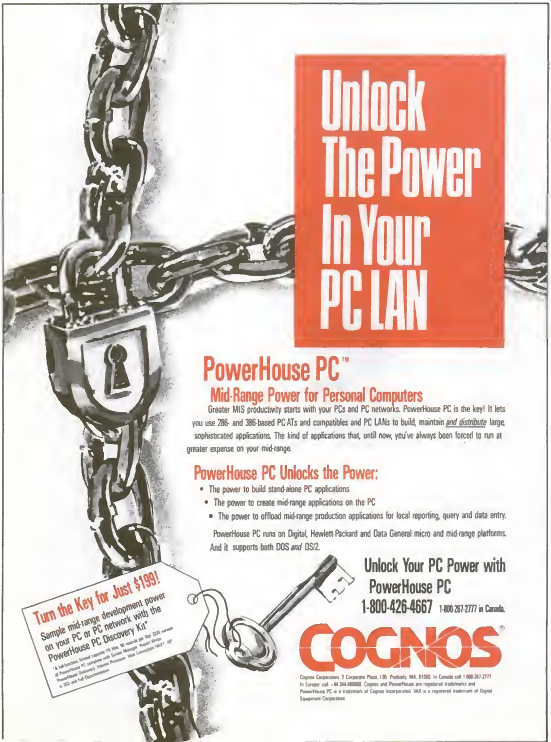
For example, the easiest way to make sure the "works made for hire" rule applies is to have a contract that says it does. While the technically correct way to do this is a little involved, the basic idea holds.

In my own consulting practice, I have yet to be presented with a contract that deals adequately with these issues, and yet the attendant potential liabilities are enormous. This is particularly true in those instances where a client company anticipates significant operational dependence on, or competitive advantage from, a new system.

If you are in a situation where software is being developed for your use, in whole or as an add-on to a package or existing system, take care to carefully define your rights in the contract. If you employ programmers, consider using written agreements to document understandings regarding who owns the software.

> A WELL-WRITTEN contract is all it takes to spell out precisely and unambiguously exactly who owns what and what everybody's rights are.

Gruenfeld, a management consulting partner in the Los Angeles office of Touche Ross & Co., specializes in computer-related legal matters, including contracting and litigation.



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Creative

CONTINUED FROM PAGE 103

stages of financial ownership. A good example is one of the firm's first investments, Metromail Corp., which sells database services to direct-mail marketing firms.

Welsh Carson engineered the acquisition of Metromail from parent Metromedia Co. for $30 million in 1980, took it public in 1984 and assisted with its acquisition by R. R. Donnelley & Sons Co. for $280 million in 1987. Throughout that period, Welsh Carson partners served on the Metromail board, a measure they take with all firms in which they invest — whether in the computer or health care industry.

'Lean and busy'

While many firms boast that they are lean and mean, Welsh Carson's motto might be "Lean and Busy." The firm consists of exactly eight general partners plus a few support personnel — there are no associate levels.

"We enjoy making deals and dealing with companies, not managing bureaucracies and personnel," Anderson says. "We do deals instead of push paper."

Welsh Carson is currently organizing its sixth limited partnership for investors and said it sees no shortage of opportunities as the merger, acquisition and divestiture trends continue in the services industry.

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COMPUTER CAREERS

Beware of culture clashes

Finding a compatible corporate climate can be key in changing jobs

BY JANET RUHL
SPECIAL TO CW

When most computer professionals look for a new job, they carefully consider the software environment, the applications and the salary. But few spend much time investigating the one factor that could have the most to do with how happy they will be — how closely their own values mirror the company's corporate culture.

Every company has a unique character, expressed in commonly held beliefs about what makes an employee valuable, how work should be rewarded and bow employees should behave.

Even when the hardware, software and applications in two data processing shops are identical, what the computer programmer or MIS manager must do to succeed may be utterly different. All too often, computer professionals who change jobs end up changing more than they bargained for.

Take a look at how similar projects operate in companies with different cultures. Both projects involve a large, elderly, daily batch system that processes thousands of transactions nightly in support of a key corporate function. The system in this example was developed 15 years ago in-house in assembler language. Over the years, it has been enhanced in Cobol and was recently tied into a personal computer network.

Boot camp survival

In the first company, the system serves as boot camp for new recruits. Only after these people have shown that they are tough enough to survive it will they work on something else. There is no test system in this company; it is considered an expensive frill.

If someone questions the lack of a test system, be will uncover an underlying attitude that test systems are for sissies. Besides, debugging this system demands genius and is the perfect way for the programmer who bopes to get ahead to show off technical skills.

The bulk of all systems maintenance is conducted by the on-call programmers, and all programmers on the project spend at least one week on call once a month. When on call, the programmers bring in their sleeping bags and sleep under their desks because they know that if they go home, they will have to turn around and come back, because the system crashes nightly. And of course, in this kind of shop anyone who is not willing to put in overtime every day is dismissed as not being serious about building a career.

This environment may not be your idea of a fun place to work, but a surprisingly large number of shops fall into this mold.

The managers who do well in this company are bright and capable. They talk constantly of challenges and get downright sentimental recounting the days when they worked for weeks without a day off to meet impossible deadlines, the great times they had at the data center at 3 a.m. and their 15 weeks of unclaimed vacation.

EVEN WHEN the hardware, software and applications in two data processing shops are identical, what the computer programmer or MIS manager must do to succeed may be utterly different.

At the second company, the focus is more on "the business." Programming is just something that everyone has to do to get into the game, and the game is office politics.

The system in this shop actually works a lot better than the one we just described. It has to: No one on the project invests much time in acquiring the programming skills needed to cope with serious technical crises. Over the years, the system has been subject to task forces, study groups and all the other organizational gambits useful for developing low-level management skills. Periodically, when something really serious goes wrong or when a complex enhancement is needed, outside consultants do the work.

The system has an excellent test system, too, if for no other reason than to make sure that the information systems management team does not end up looking bad because of buggy enhancements.

The key here is that everyone learns quickly that the chances of being promoted for technical achievements are nil. The old cliche applies: It isn't what you know but who you know.

MIS managers in this company love to tell funny stories about what awful programmers they used to be and bow much they hated to code. People coming up in the organization quickly adopt this style. The company hands out weekly, monthly and quarterly performance awards, and no desk is without its Lucite plaque. But the only reward that is really taken seriously is a promotion out of programming.

Power alignment

For a programmer working in this kind of shop, the only serious error is to be unaware of the current alignment of power.

Again, this kind of place is not for everyone. But for those who find decoding spaghetti logic less compelling than negotiating the convoluted pathways of daily life, life here is never dull.

The trouble only arises when a devoted technophile unaware of political currents bumbles into such a situation and attempts to ignore the forces at work and do things "right."

These are two extreme cases. Every company you interview with will have its own flavor, with major implications for working conditions there.

At the interview, it is difficult to assess corporate culture. Your best bet is to pay a lot of attention to subtle cues — listen closely to the language that the interviewers use and note which points they dwell on.

More important, though, is to talk to people who work or have worked in the company to see if you notice patterns emerging when they discuss their careers.

Ruhl is a consultant programmer in Windsor, Conn., and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals*, from Yourdon Press.

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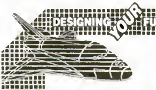

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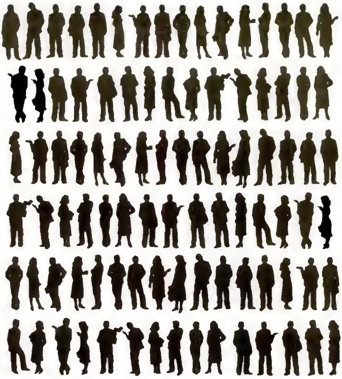

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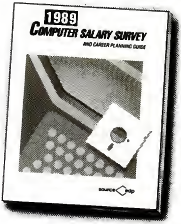

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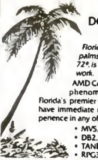

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MARKETPLACE

IBM 3480s face competition

Tape drive costs decline, causing price wars in the secondary market

BY ROBERT J. CALLERY
IDC FINANCIAL SERVICES CORP.

On September 27, 1988, IBM made the following announcements about their 3480 tape drives:

- Price cuts.
- Increased buffer memory from 1M byte to 2M bytes.
- Attachment to 3090 4.5M bit/sec. channels.
- A statement of direction to support increased cartridge capacities three to five times the current 200M-byte limit.

Since then, used prices of the 3480 tape subsystem control units and tape drives have declined significantly.

At the time of the announcement, the 3480 Model A22 was trading on the secondary market for approximately $49,000 retail, while the 3480 Model B22 was trading for $28,000. Now, four months later, the Model A22 retails for approximately $41,000 and the B22 retails for about $20,000. This represents a decline of nearly 16% and 29%, respectively.

Although the price cuts and significantly improved Volume Purchase Agreements (VPA) played a role in the used price decline, the most important cause of the price erosion was a dramatic increase in the supply of used equipment.

From 1984, when the Model A22 and Model B22 18-track cartridge subsystems were first announced, until early 1988, IBM had virually no competition in the cartridge tape marketplace. Its customers were able to dispose of reels of tape for smaller, compact cartridge units. The impact of the migration from reel-to-reel to cartridge was devastating on 3420 used prices: Within six months of the first shipment, the market for the top-of-the-line 3420 Model 8 dropped 43%.

Alone at the top

The supply of 3420s was incredibly large and continually increasing as users migrated to the new tape devices. IBM stood alone controlling the marketplace for 3½ years as the only vendor offering a cartridge tape product. This dominance has been shown in IBM's historical 3480 pricing trends.

The published list price for the Model A22 on the day of its announcement was $65,430. The published list price for the Model B22 on the same day was $43,120. The first decrease in these respective prices did not occur until the September price cut. How could IBM go 40 months before lowering its list prices? The company faced little to no competition in the 18-track cartridge tape arena.

IBM tape drives

Current fair market value

Model	Date shipped	List price	Retail percent of list price
3420 Model 4	Fourth-quarter '73	$19,295	2%
3420 Model 6	Fourth-quarter '73	$22,135	3%
3420 Model 8	Fourth-quarter '73	$24,285	7%
3803 Model 2	Fourth-quarter '73	$30,300	17%
3480 Model A22	First-quarter '85	$56,930	72%
3480 Model B22	First-quarter '85	$39,840	50%

SOURCE: IDC FINANCIAL SERVICES CORP.
CW CHART

This raises the question of where the supply of 3480s came from. While IBM was busy selling its highly successful 3480, its plug-compatible rivals were designing and building their own tape drive versions. Storage Technology Corp., National Advanced Systems and Memorex Telex N.V.'s versions of the 3480 surpassed IBM's models by offering improved features and functionality. IBM's September 1988 announcement merely brought its 3480 to the level of performance standards already offered by its plug-compatible manufacturers' (PCM) competition.

PCM vendors are having significant success convincing customers to try their tape products. In doing so, the PCMs are displacing large quantities of 3480s. Users who have 3480s on lease send the equipment back to the lessor upon lease expiration, while users who purchased 3480s sell them on the secondary market. Either way, the used market receives an influx of used 3480s.

Another source contributing to the supply is large accounts that qualify for very aggressive VPAs. In order to remain qualified, some of these customers sell equipment on the secondary market, only to buy the same gear new from IBM, thus satisfying their commitment to purchase a guaranteed number of boxes. When supply increases and demand for used boxes cannot keep up, prices fall.

With four major vendors vying for portions of the 18-track 3480 marketplace, 1989 promises to be a year of intense competition among these players. It should also be a year of opportunity for those in need of cartridge tape drives.

Significant discounting from vendors is likely to be the rule rather than the exception. This should put users in the driver's seat when buying new equipment directly from the vendors. The secondary market also is expected to offer some attractive alternatives as the price of used 3480s continues to decline.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 508-872-8200.

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The BoCoEx index on used computers

Closing prices report for the week ending Feb. 3, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	$775	$875	$400
XT Model 086	$1,150	$1,250	$900
XT Model 089	$1,250	$1,575	$1,050
AT Model 099	$1,650	$2,000	$1,525
AT Model 239	$1,875	$2,100	$1,800
AT Model 339	$2,250	$3,600	$1,800
PS/2 Model 30	$1,475	$1,700	$1,300
PS/2 Model 50	$2,350	$2,600	$1,900
Compaq Portable I	$650	$975	$600
Portable II	$1,950	$2,100	$1,750
Portable III	$3,000	$3,175	$2,500
Portable 286	$1,750	$1,975	$1,675
Plus	$1,050	$1,300	$800
Deskpro 286	$2,200	$2,350	$1,800
Deskpro 386	$3,900	$3,975	$3,675
Apple Macintosh 512	$700	$950	$550
512E	$900	$975	$700
Plus	$1,150	$1,225	$1,000
II	$4,300	$5,100	$3,800
Leading Edge Model D	$900	$950	$850
Toshiba T3200	$3,000	$3,200	$3,000

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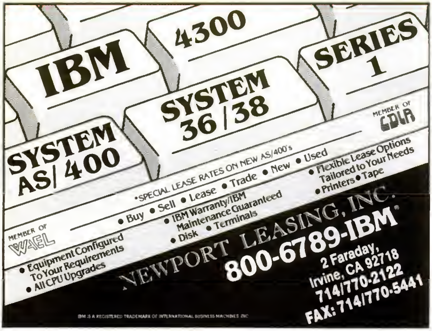

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Instilling business sense

IS leaders are taking radical steps to impart an understanding of management

BY STEWART L. STOKES JR.
SPECIAL TO CW

You are an information systems manager who agrees that your people need to become more knowledgeable about your company's business — its products, customers, distribution channels, organizational structure and industry trends. You know your people and the company would benefit from a greater awareness of how IS supports functional areas.

You are also convinced that your systems professionals need to learn to think like managers and approach problem-solving wearing a manager's hat.

Fine. Now you face the task of determining how to help your people learn about the business and establishing how managers think.

Only then can you assess what kind of education and professional development experiences you should be providing to them.

These questions were taken up by a group of 200 senior systems managers and human resources professionals I surveyed recently. Their responses provide insight into how a number of information systems organizations are providing their people with opportunities.

Time-consuming tactics

While some of the tactics may seem time-consuming at first, I am convinced they need to become part of every IS manager's agenda for professional staff education and personal development.

One way that some progressive IS managers seek to ensure their systems professionals are more business-oriented is by hiring the right kind of person. About 6% of the survey respondents emphasized this point. One said, "Strict techies have a limited place in today's IS world."

In addition to the usual in-house and outside courses and seminars, nearly one-fourth of the respondents said they also provide coaching through informal talks and formal briefings on topics such as strategy and politics. These presentations sometimes involve representatives from various functional areas as well as outside speakers.

Specific goals that some managers are pursuing include teaching workers to analyze the reports they generate and requiring them to present proposals in terms of a business case instead of a technological one.

Managers are going much further, however, by bringing IS workers into closer contact with business departments. They are training staff members in client organizations, creating internships for them there, sending them out to travel with people in the field and otherwise assigning them to work closely with functional areas. Such measures were reported by 25% of the survey respondents.

SPECIFIC GOALS include teaching workers to analyze the reports they generate and requiring them to present proposals in terms of a business case instead of a technological one.

Moving toward a fuller integration of IS and business areas, 10% of the respondents say they are establishing rotation of jobs among IS and other departments and assigning IS workers to report directly or indirectly to functional managers.

These approaches provide food for thought, given the increasing demands that systems and technology be focused on competitive advantages.

On the question of encouraging professionals to think like managers, many of the replies stress the need for IS workers to base recommendations on business merits rather than technological ones.

The managers say doing so requires considering the impact of projects on the entire organization rather than just the IS department.

"Systems people should make decisions with the attitude that this is their company — looking at the big picture," one manager said.

"Managers think in terms of whether this proposal will pay and whether it is necessary for the success of the business," another said.

Specifically, IS professionals should think about projects in terms of costs and benefits rather than think about leading-edge technology, according to other responses.

Acquire people skills

The managers also urge information systems professionals to remember that not all business problems are best solved by new systems or hardware. They also emphasize the need for managers to be people-oriented and for systems professionals to acquire people skills.

The responses do not dismiss the need for some technical acumen, however. IS managers must manage a technical function while bridging the gap to the business world, one manager said.

These attitudes can contribute to the agenda for the education and professional development of systems professionals and managers, an agenda that continually expands with the increasing pressure placed upon IS management for accountability and effectiveness.

Stokes is a senior vice-president of QED Information Sciences, Inc. in Wellesley, Mass.

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3/20 - **Executive Report:** Human Resource Development
3/27 - **Product Spotlight:** CASE Products
4/3 - **Executive Report:** Cost Control & Justification
4/10 - **Product Spotlight:** PC's & Compatibles
4/17 - **Executive Report:** Business Executives Access MIS
4/24 - **Executive Report:** Managing after a Merger
5/1 - **Product Spotlight:** Network Management Tools
5/8 - **Executive Report:** Automating the Data Center
5/15 - **Product Spotlight:** Manufacturing Technology
5/22 - **Executive Report:** Restructuring MIS - Distributing Resources
5/19 - **Product Spotlight:** Printers & Plotters
6/5 - **Special Feature:** Systems Integration
Exectuive Report: Workgroup Computing
6/12 - **Executive Report:** Technology Issues in Downsizing
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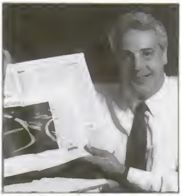

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Mar. 6	Special Feature: Systems Integration Executive Report: MIS in the Federal Government	
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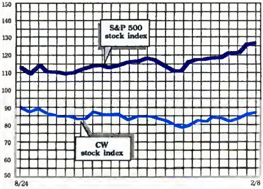

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Software & DP Services	113.0	**115.2**
Semiconductors	57.9	**57.9**
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Leasing Companies	96.9	**96.1**
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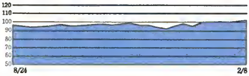
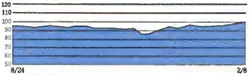
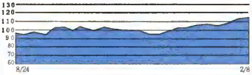
Communications



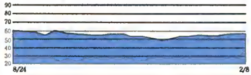
Computer Systems



Software and DP Services



Semiconductors



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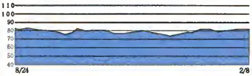
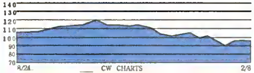


Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEB. 8, 1989

Communications and Network Services

EXCN		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 9 1989	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	53	42	52	0.1	0.2
Q	ANDREW CORP	22	13	21	1.0	5.0
Q	ARTEL COMM CORP	3	1	1.625	-0.1	-7.1
N	AT&T	33	24	32	-0.1	-0.4
Q	AVANT GARDE COMP INC	3	0	0.5	0.1	14.2
Q	AVANTEK INC	6	4	5.75	0.0	0.0
N	AYDIN CORP	17	13	15	0.5	5.3
N	BELL ATLANTIC CORP	76	64	74.625	-0.6	-0.8
N	BELLSOUTH CORP	44	37	42.625	0.3	0.6
Q	COMPRESSION LABS INC	3	3	3.625	0.1	3.6
O	COMPUTER NETWORK TECH	2	1	1.657	-0.1	-7.0
O	CONTEL CORP	47	31	47.25	2.5	6.6
Q	DATA SWITCH CORP	10	5	5.25	-0.1	-2.3
Q	DIGITAL COMM ASSOC	38	17	24	0.1	0.5
Q	DYNATECH CORP	24	17	18.625	-0.1	-0.7
Q	FIBRONICS INTERNATIONAL INC	5	2	4.688	0.7	17.2
Q	GANDALF TECHNOLOGIES	8	5	5	0.1	2.6
Q	GENERAL DATACOMM INDS	5	3	5	-0.1	-2.4
N	GTE CORP	47	34	46.5	0.0	0.0
Q	INFOTRON SYS CORP	14	7	11.75	0.5	5.6
N	ITT CORP	56	44	55.125	0.6	1.1
N	M A COM INC	11	9	8.5	0.0	0.0
Q	MCI COMMUNICATIONS CORP	27	10	25.875	0.1	0.5
Q	NETWORK EQUIPMENT TECH INC	23	14	20.75	1.3	6.4
Q	NETWORK SYS CORP	12	7	9.75	0.1	1.3
N	NORTHERN TELECOM LTD	20	16	15.875	0.1	0.8
Q	NOVELL INC	36	16	34.75	2.3	6.9
N	NYNEX CORP	71	61	70	0.4	0.6
N	PACIFIC TELESIS GROUP	34	27	33.125	-0.1	-0.4
N	PARADYNE CORP	10	4	10.25	0.1	1.2
A	PENRIL CORP	6	3	4.625	0.1	1.4
N	PLESSEY PLC	44	25	42.6	0.3	0.6
N	SCIENTIFIC ATLANTA INC	16	10	14.876	0.3	1.7
N	SOUTHWESTERN BELL CORP	44	34	43.3	0.1	0.3
Q	3 COM CORP	28	16	26.375	1.0	3.9
N	U S WEST INC	63	50	62.25	0.3	0.4

Computer Systems

Q	ALLIANT COMPUTER SYS	6	3	3.5	0.0	0.0
Q	ALPHA MICROSYSTEMS	6	4	7	0.0	0.0
Q	ALTOS COMPUTER SYS	13	7	7.625	0.0	0.0
A	AMDAHL CORP	28	19	19.75	-0.1	-0.6
Q	APOLLO COMPUTER INC	17	7	7.625	-0.1	-1.6
Q	APPLE COMPUTER INC	48	36	38.25	-1.0	-2.5
N	BOLT BERANEK & NEWMAN	19	10	10.6	0.3	2.4
Q	BRITTON LEE INC	4	1	3.438	0.3	7.8
N	COMPAQ COMPUTER CORP	76	43	74	0.8	1.0
Q	COMPUTER AUTOMATION INC	14	3	5.625	0.0	0.0
A	COMPUTER CONSOLES INC	13	6	12.6	0.0	0.0
Q	CONCURRENT COMP CORP	20	6	4.876	-0.1	-2.7
N	CONTROL DATA CORP	31	16	19.875	-0.4	-1.9
Q	CONVEX COMPUTER CORP	11	7	10.76	-0.1	-1.1
N	CRAY RESH INC	89	53	51.25	-0.5	-0.8
Q	DAISY SYS CORP	12	9	6.376	0.3	4.1
N	DATA GEN CORP	28	17	16.125	-0.1	-0.7
N	DATAPOINT CORP	6	4	4.6	0.1	2.9
Q	DELL COMPUTER CORP	13	9	8.6	-0.4	-4.2
N	DIGITAL EQUIP CORP	127	86	114.376	-5.4	-4.5
N	FLOATING POINT SYS INC	5	2	3.25	-0.1	-3.7
N	HARRIS CORP	33	25	29.25	0.3	0.9
N	HEWLETT PACKARD CO	66	44	61.5	3.9	6.7
N	HONEYWELL INC	77	57	64	1.0	1.6
N	IBM	131	104	127	-2.6	-2.0
Q	INFORMATION INTL INC	19	11	14.625	-0.1	-0.8
Q	IPL SYS INC	9	1	6.25	0.8	13.6
N	MAI BASIC FOUR INC	21	7	10.5	3.1	-8.0
N	MATSUSHITA ELEC INDL LTD	230	169	190.5	-4.6	-2.4
Q	MEGADATA CORP	4	1	1.5	-0.2	-11.1
Q	MENTOR GRAPHICS CORP	37	20	33.25	0.3	0.8
N	NBI INC	7	1	1.75	0.1	7.7
N	NCR CORP	70	61	59.75	1.5	2.6
N	PRIME COMPUTER INC	21	12	20.25	0.6	3.2
Q	PYRAMID TECHNOLOGY	19	9	16.625	0.9	4.9
Q	SILICON GRAPHICS CORP	25	14	18.75	-0.4	-2.0
Q	STRATUS COMPUTER	32	21	31.73	1.3	4.1
Q	SUN MICROSYSTEM INC	21	13	18.75	-0.3	-1.3
Q	SYMBOLICS INC	2	1	1.375	0.3	22.2
Q	SEQUENT COMPUTER SYS INC	25	14	22.75	-1.1	-4.7
N	TANDEM COMPUTERS INC	22	12	19.625	-0.4	-1.9
N	TANDY CORP	49	34	43.75	1.8	4.2
N	ULTIMATE CORP	16	9	11.125	1.5	15.6
N	UNISYS CORP	39	25	26.625	-0.1	-0.4
A	WANG LABS INC	17	9	10	0.8	8.6

Software & DP Services

Q	ADVANCED COMP TECH	4	1	3.063	0.4	14.0
Q	AMERICAN MGMT SYS INC	19	12	17	0.1	0.7
Q	AMERICAN SOFTWARE INC	19	9	17.625	0.0	0.0
N	ANACOMP INC	12	8	7	0.4	5.7
Q	ANALYSTS INTL CORP	15	7	14.5	0.0	0.0
Q	ASHTON TATE	31	20	23	0.9	4.0
Q	ASK COMPUTER SYS INC	16	10	16.125	1.3	7.4
Q	AUTODESK INC	34	17	33	2.8	9.1
N	AUTO DATA PROCESSING	47	36	40.876	0.4	0.9
Q	BMC SOFTWARE INC	17	9	19	0.0	0.0
Q	BOOLE & BABBAGE INC	14	9	12.6	-0.5	-3.8
N	BUSINESSLAND INC	15	8	14.875	1.3	9.2
N	COMPUTER ASSOC INTL INC	40	24	37.625	-0.6	-1.6
Q	COMPUTER HORIZONS CORP	12	7	9.75	-0.3	-2.5
N	COMPUTER SCIENCES CORP	55	38	53.125	1.0	1.8
Q	CORPORATE SOFTWARE	15	9	11	0.5	4.8
N	COMPUTER TASK GROUP INC	17	10	12.876	-0.6	-4.5
Q	COGNOS INC	9	6	6.625	-0.3	-2.8
Q	COMSHARE INC	26	13	24.5	-0.8	-3.0
N	CULLINET SOFTWARE INC	6	4	5.875	-0.6	-9.9
Q	DUQUESNE SYS INC	24	16	22.5	0.4	1.7
N	GENERAL MTRS (CLS E)	47	36	46	-1.5	-3.2
Q	HOGAN SYS INC	9	3	4.75	-0.1	-2.6
Q	INFORMIX CORP	25	7	9.875	0.9	9.7
Q	INTELLICORP INC	4	2	3.438	0.1	1.9
Q	KEANE INC	19	7	18.25	-0.3	-1.4
Q	LOTUS DEV CORP	34	15	20.25	-0.5	-2.4
Q	MANAGEMENT SCI AMER	14	9	6.125	-0.4	-4.4
Q	MICRO PRO INTL CORP	4	2	2.125	0.1	3.0
Q	MICROSOFT CORP	71	45	62.5	3.3	5.5
Q	MORINO ASSOCIATES INC	20	12	20	0.8	3.9
Q	NATIONAL DATA CORP	32	19	24.25	-0.8	-3.0
N	ON LINE SOFTWARE INTL INC	14	4	4.76	0.1	2.7
Q	ORACLE SYS CORP	25	13	24	-0.6	-2.0
N	PANSOPHIC SYS INC	19	12	14.875	0.3	1.7
Q	PHOENIX TECHNOLOGIES INC	18	12	18.75	2.8	17.2
Q	POLICY MGMT SYS CORP	27	21	26.25	1.3	5.0
Q	PROGRAMMING & SYS INC	18	10	17	0.6	3.0
Q	RABBIT SOFTWARE INC	3	2	2.76	-0.1	-4.3
Q	RELATIONAL TECHNOLOGY INC	21	12	15.75	1.4	9.6
N	REYNOLDS & REYNOLDS CO	26	17	28.875	1.6	6.0
Q	SEI CORP	22	14	18.875	-0.1	-0.7
Q	SHARED MED SYS CORP	27	14	18.375	0.0	0.0
Q	SAGE SOFTWARE INC	9	6	7.876	0.1	1.6
Q	SOFTWARE PUBG CORP	27	9	20.25	-0.1	-0.6
A	STERLING SOFTWARE INC	9	6	6.876	0.1	1.9
Q	SUNGARD DATA SYS INC	20	14	15.76	0.9	5.9
Q	SYSTEMATICS INC	34	26	32.75	2.0	6.5
N	SYS. SOFT INC	25	9	23.73	-1.3	-5.0
Q	VM SOFTWARE INC	21	9	20.25	0.3	1.3

Semiconductors

N	ADV MICRO DEVICES INC	17	7	8	0.0	0.0
N	ANALOG DEVICES INC	16	10	12.25	-0.1	-1.0
Q	ANALOGIC CORP	10	6	9.125	-0.3	-2.7
Q	CHIPS & TECHNOLOGIES INC	21	11	17	1.0	6.3
Q	INTEL CORP	37	18	26.25	-0.5	-1.9
Q	LSI LOGIC CORP	14	7	11.25	-0.1	-1.1
Q	MICRON TECHNOLOGY INC	26	14	17.625	0.0	0.0
N	MOTOROLA INC	55	36	45.875	0.5	1.4
N	NATL SEMICONDUCTOR	15	9	6.876	0.3	2.9
N	TEXAS INSTRS INC	57	35	43.125	0.0	0.0
A	WESTERN DIGITAL CORP	19	11	13.625	-0.4	-2.7

Peripherals

Q	ALLOY COMP	6	2	2.25	0.1	5.9
N	AM INTL INC	9	3	5.625	0.1	2.3
Q	AST RESH INC	17	7	7.75	0.0	0.0
Q	AUTO TROL TECH CORP	6	4	5	-0.1	-2.4
Q	BANCTEC INC	12	6	11.875	0.8	5.7
Q	CIPHER DATA PRODS INC	11	7	10	0.0	0.0
A	COGNITRONICS CORP	4	2	3.125	0.0	0.0
Q	CONNOR PERIPHERALS	10	7	6.25	-0.1	-1.5
A	DATAPRODUCTS CORP	16	9	14.25	-0.1	-0.9
A	DATARAM CORP	9	6	8.376	-0.6	-6.9
N	EASTMAN KODAK CO	50	39	48.876	0.0	0.0
Q	E M C CORP MASS	19	4	5.375	0.5	10.3
Q	EMULEX CORP	12	6	12	0.1	1.1
Q	EVANS & SUTHERLAND	23	13	16.25	0.3	1.6
Q	ICOT CORP	6	2	2.5	0.0	0.0
Q	INTERLEAF INC	21	9	7.625	0.8	10.9
Q	IOMEGA CORP	9	3	2.75	-0.3	-8.3
Q	LEE DATA CORP	4	3	2.813	0.0	0.0
Q	MASSTOR SYS CORP	4	2	3.188	0.3	10.6
Q	MAXTOR CORP	19	6	9.25	0.3	2.8
Q	MICROPOLIS CORP	30	6	6.76	-0.5	-6.9
Q	MINISCRIBE CORP	14	6	5.975	-0.6	-9.6
N	MINNESOTA MNG & MFG CO	70	56	67.875	-0.3	-0.4
Q	PERSONAL COMPUTER PRODUCTS INC	7	4	4.188	-0.1	-2.9
Q	PRIAM CORP	3	1	1	0.0	0.0
Q	PRINTRONIX INC	11	8	7.625	-0.3	-3.2
N	QMS INC	12	5	8.76	-0.3	-2.8
Q	QUANTUM CORP	16	10	14.76	0.5	3.5
N	RECOGNITION EQUIP INC	12	8	10.75	0.1	1.2
Q	REXON INC	9	4	7.375	0.8	11.3
Q	SEAGATE TECHNOLOGY	23	7	11.876	-0.1	-1.0
N	STORAGE TECH CORP	4	1	1.75	-0.1	-6.7
Q	TANDON CORP	3	1	1.313	0.3	23.5
N	TEKTRONIX INC	30	19	23	0.1	0.5
Q	TELEVIDEO SYS INC	2	0	0.375	-0.1	-14.4
N	XEROX CORP	65	50	62.75	-0.5	-0.8

Leasing Companies

Q	AMPLICON INC	20	11	16.76	1.3	6.6
N	CAPITAL ASSOCIATES INTERNATIONAL INC	7	4	6.625	-0.3	-3.6
N	COMDISCO INC	25	19	25.3	1.1	4.5
Q	CONTINENTAL INFO SYS	9	0	0.563	-0.2	-24.9
Q	LDI CORPORATION	14	10	14	1.0	7.7
Q	PHOENIX AMERN INC	4	3	3.75	0.3	7.1
Q	SELECTERM INC	7	4	6	0.3	4.3

EXCH:N—NEW YORK;A—AMERICAN;Q—NATIONAL

Street sleet

Prices follow mercury down as bad news ices recent gains

The Alaskan Express cold front finally reached Wall Street last week as several major issues hunkered down and went into a brief hibernation. The bloom was certainly off the rose at Digital Equipment Corp., where a string of advances came to a crashing halt. Share prices for the Maynard, Mass.-based giant closed Thursday's market at 114⅜, down 4⅞ points from a week earlier.

Also taking a tumble was chip maker Intel Corp., which announced disappointing results and suffered accordingly: its stock fell 1¼ points for the four days of trading to 26. Other sinkers included IBM, down 1⅜ points to 126⅜; Lotus Development Corp., down 1½ points to 20¾; Prime Computer, Inc., off 1¼ points to 19½; and 3Com Corp., down 1⅛ points to 25⅝.

Gainers on the Big Board included Microsoft Corp. The pride of Redmond, Wash., continued to impress investors and climbed 2¾ points to 63¾. Also gaining was local-area network maker Novell, Inc., which announced a deal with Prime that will give the industry the first Unix version of Netware. Novell shares rose 1½ points to 35¼.

JAMES DALY

ESA

FROM PAGE 1

through an enhanced sorting algorithm and improved I/O.

DF Sort attains a performance boost by allowing data to reside in hiperspace, a high-performance use of expanded memory. As a result, I/O to disk may not be required during a sort, cutting the time needed to execute. DF Sort Release 11, slated to be available March 24, reportedly can perform a sort in 75% the time it takes Release 10 under MVS/XA. IBM termed the function "hipersorting."

"There seems to be no reason why we won't go to it," said Mike Dille, managing director of data processing at Fingerhut Corp., a mail-order firm in Minnetonka, Minn. Now a user of DF Sort, Fingerhut has implemented MVS/ESA on two ES/3090 Model 400S mainframes.

"There are temporary work files where the sort resides. Up until now, those have always been on disk. Now those will be in memory," Dille explained.

IBM got the jump on makers of competing sort utilities. Syncsort, Inc. and Computer Associates International, Inc. promised they would release versions of their sort packages that take advantage of ESA. "We are working on our next release, and we will exploit hiperspace," said Donald Wszolek, vice-president of marketing at Syncsort.

Another package, CICS Data Tables, is said to require ESA and improve performance by similarly allowing data to reside in expanded memory as well as main memory.

However, CICS Data Tables does not use ESA's hiperspace or data spaces, another ESA feature, IBM officials said. Data Tables will reportedly be available March 10.

Among new hardware products, the IBM ES/3090 Model 100S takes the place of the IBM 3090 Model 120S as the gateway to IBM's top-of-the-line processors.

The mainframe is slated to begin shipping as a fixed-configuration system in April. Expanded storage, Processor Resource/System Manager and a vector facility are all scheduled for June shipment.

The Model 100S is said to offer 70% of the internal throughput rate of the Model 120S. The base price of the new 3090 is $795,000; a Model 120S has a price of $985,000.

While the Model 100S may look like a low-priced mainframe, it has the highest cost per million instructions per second (MIPS) of the low-end 100S series in the 3090 lineup, according to Steve Josselyn, an analyst at International Data Corp., a Framingham, Mass.-based market research firm. As a result, Josselyn questioned why any customers would want to enter the 3090 line at that price.

"It might be a machine for high-growth companies just coming into the 3090 line, but it's not a growth machine for those at the top of the 4381 line," Josselyn said.

The new entry point for ESA-capable 4381s held up better in a cost-per-MIPS comparison, according to Josselyn. While the former entry point, the ES/4381 Model 91E, would have an estimated cost per MIPS of $123,481, the 4381 Model 90E, scheduled for Sept. 29, is estimated at $102,016 per MIPS. "That makes it the best in the 4381 line," he said.

An IBM spokeswoman said the 3090 Model 100S has not been targeted at a specific group, but it will likely sell to lower end 4381 users planning an upgrade in the next year.

But like Ingersoll-Rand, other lower end 4381 users said the idea of upgrading to a Model 100S did not grab them.

"We'll go to the low end of the 3090s, whatever it is, when we have to," said James Dooley, a vice-president at ITT Life Insurance Corp. in Plymouth, Minn. "As directions change, we recognize them, but don't feel we have to be in the first 100 to do it. Things don't change as fast as the vendor would like you to think."

Sweetening the pot

IBM price cuts announced last week are intended to make the move to ESA more attractive

	Price cut
4381 processor storage	15%
3090 central storage	9%
3090 expanded storage	11% (first 64M-byte increment), 17% (additional increments)
3990 Model 3 with caching capability	Up to 13%
4381 Models 91E and 92E	Up to 14%

SOURCE: IBM
CW CHART: FRANK C. O'CONNELL

Two sides of a coin

A new low-end 3090S features a relatively expensive price/performance factor, while the new 4381E is less expensive than the former low end

	Base price/ Fully-configured	*MIPS*	*Cost per MIPS*	*Relative performance*[1]
3090 Model 100S	$795,000/ $853,660	5.2	$164,165	70% of Model 120S
3090 Model 120S	$985,000/ $1,039,830	7.4	$140,518	———
4381 Model 90E	$395,000/ $397,861	3.8	$102,016	80% of Model 91E
4381 Model 91E	$556,500/ $580,361	4.7	$123,481	———

[1] Based on internal throughput rates from IBM

SOURCE: INTERNATIONAL DATA CORP.
CW CHART: FRANK O'CONNELL

IBM offerings fleshed out

Last week's IBM announcement included a number of additional software and hardware points:

- IBM's Cross System Product (CSP) Version 3 Release 2 Modification Level 2 will be available in July. The release allows programs developed using design tools other than CSP to be imported into CSP/Application Development. Index Technology Corp. in Cambridge, Mass., announced it is developing a customized version of its Excelerator computer-aided software engineering product, Excelerator/CSP, to use CSP/AD's approach.
- IBM said it plans to allow applications generated with the new CSP release on a 370 architecture system, including those using SQL statements, to be executed on a future release of the OS/400 operating system. OS/400 is used on IBM's Application System/400 minicomputers. The new OS/400 release is slated to be available this year.
- VM/XA SP Release 2, introduced in December, will be enhanced to support the basic functions of the IBM 3990 Model 3 Storage Control for guests and CMS users this December.
- Up to seven IBM Processor Resource/System Manager (PR/SM) partitions on certain ES/3090 Model S processors will be introduced: 180S, 200S, 280S, 300S, 400S, 500S and 600S. The 150S, 120S or 100S may have up to six partitions. E models remain capable of only four.
- VM/XA SP Release 2 will be supported in a PR/SM logical partition for test and development purposes only.

STANLEY GIBSON

Olivetti/ISC challenges IBM in banking sector

BY NELL MARGOLIS
CW STAFF

NEW YORK — An impending merger between Italian technology giant Ing. C. Olivetti & Co.'s U.S. subsidiary and Spokane, Wash.-based ISC Systems Corp. will boost Olivetti into second place in the U.S. branch banking automation sector, trailing only IBM.

Olivetti announced last week that it will pay approximately $174 million for ISC, a 12-year-old supplier of turnkey systems to savings and loan institutions, credit unions and, in the last several years, commercial banks. It will join its latest purchase to an earlier investment in U.S.-based banking automation — Shelton, Conn.-based Bunker Ramo Corp., a leading systems supplier to commercial banks and thrifts.

The company that emerges, according to a Bunker Ramo spokesman, will pit a combined customer base of approximately 3,450 and 1988 revenue of approximately $250 million against the rest of the branch banking automation market, which sources estimated at $2.5 billion worldwide.

It will also mount a formidable challenge to market leader IBM, said James Lindner, currently chief executive officer of Bunker Ramo and slated to become chairman and CEO of the merged company.

The ISC acquisition-and-merger strategy, aimed at providing Olivetti with expanded global and especially U.S. computer industry presence, was not conceived expressly for the purpose of taking on IBM, Lindner said. However, once consummated, the deal will have that effect, he added.

"IBM is a competitor in every deal we go after," he said. Bunker Ramo has estimated its own share of the branch automation market at 8%, ISC's at 20% and IBM's at 32%.

The new company will draw its executives from both component parts, the Bunker Ramo spokesman said. In addition to Lindner, current ISC Chairman and CEO Ted DeMerritt will serve as vice-chairman, and John Lindeblad, now president and chief operating officer of ISC, will stay at both posts.

Pending customary corporate requirements, including antitrust clearance, the ISC acquisition is expected to close in April.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

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TRENDS

High-performance computers

Minisupers should see speediest growth in both sites and sales

	Worldwide installed base	
Type of computer	**1986**	**1991**
Supercomputers	**228**	**760**
Mainframes with vectors	**190**	**1,022**
Minisupercomputers	**450**	**15,900**
Superminis	**140,000**	**588,000**

	Worldwide sales in billions	
Type of computer	**1987**	**1991**
Supercomputers	**$1.02**	**$2.9**
Mainframes with vectors	**$0.08**	**$0.12**
Minisupercomputers	**$0.34**	**$1.5**
Superminis	**$6**	**$10.4**

A steady influx of available software applications coupled with market pressure to accelerate production cycles promises to swell demand for high-performance computers and send their revenue figures into the financial stratosphere within the next two years, according to a recent report by Computer Technology Research Corp.

The chief recipient of this ground swell promises to be the minisupercomputer market — high-powered machines priced at $1 million or less from vendors such as Convex Computer Corp., Alliant Computer Systems Corp. and FPS Computing. The worldwide installed base for these machines is projected to grow more than 35 times, from 450 machines in 1986 to nearly 16,000 in 1991. Annual sales will also rocket to $1.5 billion, the Patchogue, N.Y.-based firm said.

The windfall is also expected to reach the supercomputer industry, in which the market is forecast to nearly triple to $2.9 billion. The installed base will enjoy a similar growth rate, leaping from 228 to 760 machines.

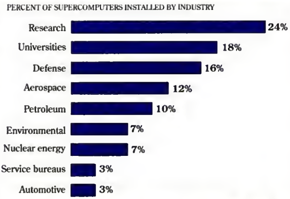
While the installed market for mainframes with vectors should also enjoy dramatic installed-base growth, the revenue enhancement will not be as great as that of supercomputers, possibly due to the lower cost of the machines.

The demand for superminicomputers will also grow, but like the mainframe-with-vectors niche, it is not expected to yield revenue growth as dramatic as that of either minisupercomputers or supercomputers.

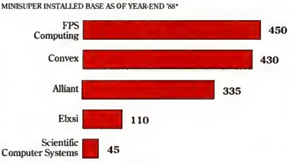
Another factor likely to have an impact on high-performance computing is the growing role of parallel processing, whereby multiple arrays of CPUs work in sync. Almost half of all high-performance minisupercomputers and mainframes are expected to use parallel processing architectures in 1991, compared with 22% in 1986.

JAMES DALY

Supers most at home in research



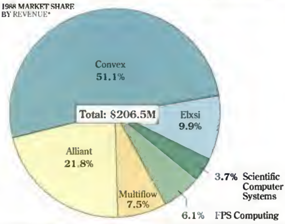
It's a close race for minisuper base . . .



* Installed base for Multiflow Computer not available

SOURCE FOR ABOVE CHARTS: COMPUTER TECHNOLOGY RESEARCH CORP.

. . . but Convex scoops up the dollars



*Preliminary figures

SOURCE: INTERNATIONAL DATA CORP.

INSIDE LINES

Under the shroud. Amdahl plans to roll out an enhanced version of its 8-year-old UTS Unix system for mainframes this week. UTS, which runs in native mode on Amdahl's IBM-compatible mainframes, supports scientific and engineering applications on the host machine. Few details were available last week on the revised UTS system, except that the emphasis will be on connectivity and recovery in distributed data networks.

Last one out is a rotten chip. Now that the Gang of Nine has produced an EISA chip, industry speculation has shifted to who among this group will be the first to deliver an EISA computer. If you're thinking Compaq, forget it. A number of industry sources have placed their bets on AST Research hustling out a system in April.

Deep-six the 8086? Lotus last year subtly (in the fine print at the bottom of printed ads) recommended that 1-2-3 Release 3.0 users have at least an Intel 80286 processor. Later this month or early next, that recommendation is expected to turn into a requirement. Lotus will use the announcement of the beta-release Release 3.0, currently scheduled for next week, to further define its personal computer spreadsheet strategy. Release 3.0 will come standard with so-called DOS Extender technology that allows programs to exceed the 640K-byte bounds of MS-DOS. This technology, which Lotus considers superior to the old bank-switching approach, requires the power of an 80286 to run. For IBM Personal Computer XT owners who will be completely unable to run Release 3.0, Lotus will enhance the old assembly-based 1-2-3 Release 2.01.

Extenders for everyone! Users interested in the OS/2 version of Ashton-Tate's Dbase are probably already irked that the product is late. Instead of shipping late last year, it is now scheduled for spring, Ashton-Tate said. This release will coincide with the shipment of Dbase IV 1.1, a product to front-end SQL Server. But what might really rankle users is the memory requirement. The machine can get along with a mere 4M bytes, but Ashton-Tate is considering recommending the 6M bytes that is really required for adequate performance. That memory appetite may fuel Ashton-Tate's interest in these DOS Extenders, which allow programs to use all the memory above 640K bytes for data and programs, instead of swallowing up 1.5M bytes for an overgrown operating system.

May the best link win. Novell, Microsoft and Banyan Systems are facing off in yet another arena: Unix. An X/Open subcommittee concerned with setting connectivity standards is busy reviewing presentations from the three camps on their differing approaches to Unix file servers. Microsoft has teamed up with Hewlett-Packard to pitch LM/X, a Unix port of OS/2 LAN Manager; Novell has hooked up with Prime to port Netware to Prime's Unix-based 386 file server; and Banyan, as could be expected, has based its Virtual Networking Software operating system on a Unix server.

Opening up Ultrix. Future versions of DEC's Ultrix operating system will be a blend of the Open Software Foundation's (OSF) code and Ultrix, according to Jim Barclay, a software consulting engineer at DEC. Last week at Dexpo East '89, Barclay said he didn't think anyone would take OSF/1 and ship it as is. For instance, DEC will add VAX-specific features for error logging and support for Decnet. Another DEC official said the company will tailor the OSF offering to target commercial production applications.

Wall Street was flooded with rumors last week (so, what else is new?). Novell was said to be on AT&T's agenda either through a buyout or strategic alliance, and while many analysts dismissed the reports, Novell stock nonetheless shot up $2. Meanwhile, Unisys was said to be ready to announce acquisition of 5% of outstanding shares of Honeywell (that's no Bull, you know). If you've got reason to think we're on the verge of another merger wave, call in your tips to the hot line, 800-343-6474 or 508-879-0700, and News Editor Pete Bartolik will pass them on to all those would-be traders of inside information.

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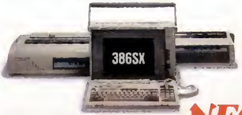

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